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APPENDIX VI

VEGETATION AND CROPPING PATTERNS SEVIER RIVER BASIN, UTAH



UNITED STATES DEPARTMENT OF AGRICULTURE
Economic Research Service Forest Service Soil Conservation Service

April, 1973

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APPENDIX VI

VEGETATION AND CROPPING PATTERNS

SEVIER RIVER BASIN, UTAH

United States Department of Agriculture

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April 1973

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Chapter I

I N T R O D U C T I O N

The purpose of this appendix is to present basic data on the vegetation in the Sevier River Basin. This information was used in developing the Sevier River Basin Summary Report (1969).

Information on the related soils and climate affecting vegetation are published in other appendices. Native vegetation is discussed by ecological formations, most of which are subdivided into climax associations and sub-climax communities. Cropping patterns are discussed under nonirrigated and irrigated land. Phreatophytes are tabulated by density of vegetation, soil, water table, and consumptive use of water.

Native vegetation surrounding the cropland areas is described by ecological classifications which relate to soil and climatic zones in place of the broad vegetative zones described in the Summary Report. These ecologic classifications refer to vegetative successional potentials rather than the actual vegetation now on the ground as shown on Map 6, Generalized Land Use Map, following page 2 in this report and in the Summary Report. The areas described cover 4,637,850 acres. The major areas described are: Alpine formation, 14,110 acres; Sub-alpine formation, 135,180 acres; Montane forest formation, 731,840 acres; Mountain shrub and pinyon-juniper upland formation, 2,496,340 acres; and Semi-desert and phreatophyte formation, 1,260,380 acres.

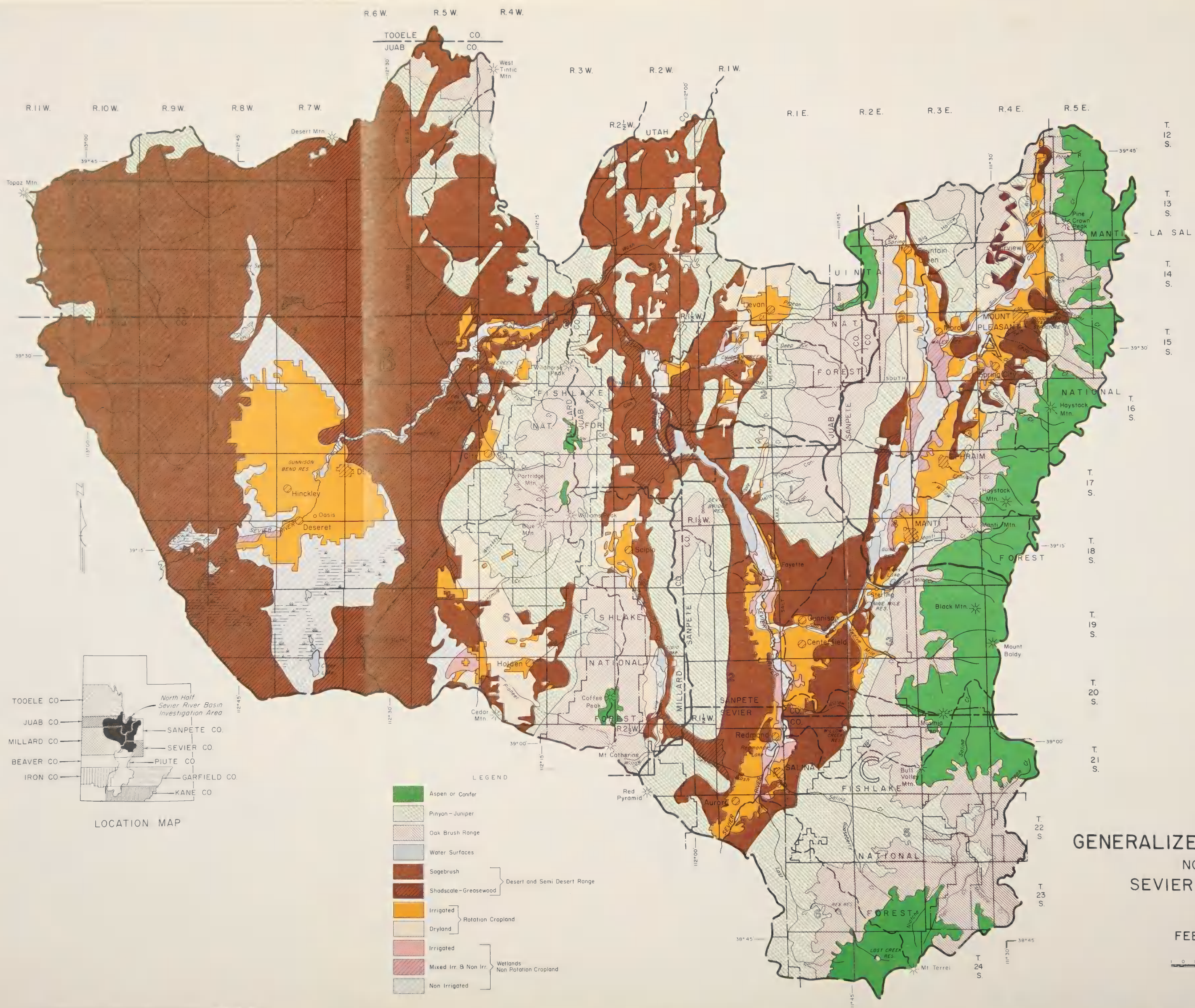
Cropland acreages and cropping patterns delineated within the water-budget areas are discussed. Over 540,000 acres are included of which 260,700 acres are irrigated, 110,100 acres are nonirrigated, and 169,500 acres are phreatophytes, water surfaces, and bare ground. About 30,000 acres of cropland are idle most of the time.

Basin-wide cropping patterns show the following: 65 percent alfalfa, 24 percent small grain, 5 percent corn, 3 percent sugar beets, 2 percent pasture, and 1 percent potatoes. In recent years, sugar beet acreage has declined rapidly and grain corn acreage has expanded.

A phreatophyte survey was conducted in 1962. Maps were prepared showing soil, water table, and vegetation by density. The areas surveyed and mapped did not necessarily coincide with the water-budget areas. Also, large acreages of some vegetative types are found outside the phreatophyte areas. The total phreatophyte area covers about

202,060 acres. The major phreatophytic vegetative types mapped are: meadow grasses, 32 percent; saltgrass, 37 percent; greasewood, 19 percent; and pickleweed, 8 percent. Tamarisk, big sagebrush, rabbit-brush, and willows make up the remaining 4 percent.

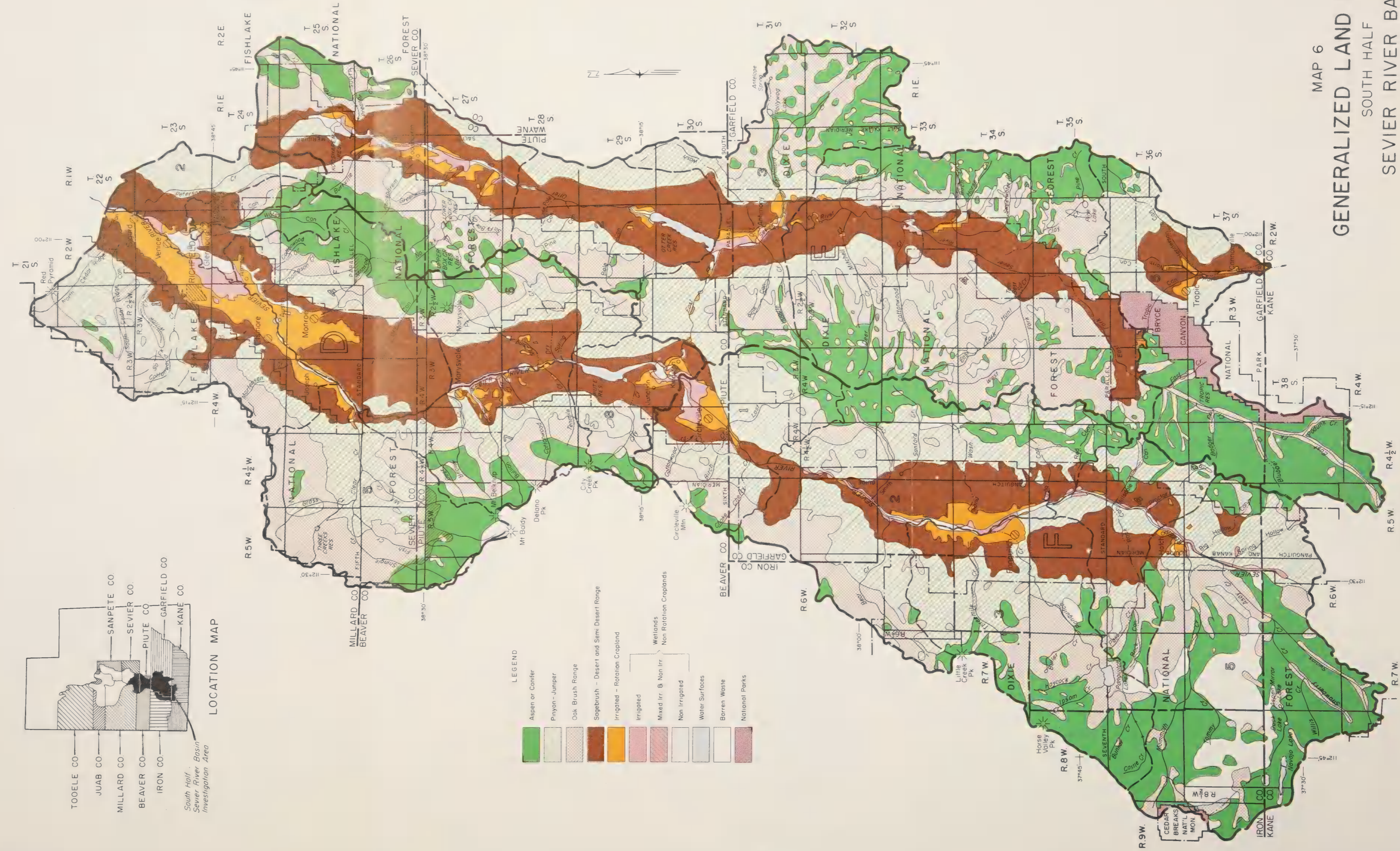
The acreages given in the Summary Report are referenced to the Generalized Land Use Map. Acreages within each vegetal formation described in this appendix are broken down into the north half and south half of the Sevier River Basin. Acreages given are estimates based on available information.



MAP 6
GENERALIZED LAND USE MAP
NORTH HALF
SEVIER RIVER BASIN
UTAH

FEBRUARY 1969

SCALE IN MILES



Chapter II

NATIVE VEGETATION

Native vegetation surrounding the cropland area is described by ecological formations. In most cases, these are delineated by climax associations and sub-climax communities.^{1/} Ecological formations are described by location, features, and principal uses. Principal identifying species are shown for vegetative associations and communities but no attempt is made to present extensive lists of all plant species.

Ecological formations from high to low elevations include Alpine, Sub-alpine, Montane forest, Mountain shrub, Pinyon-juniper upland, and Semi-desert. Classification and identification of formations, associations, and communities are somewhat arbitrary, as there is a blending between categories rather than a sharp delineation. Acreages of these delineations are shown in Table 1.

Many factors combine to produce the intricate vegetative patterns. These patterns are dynamic, ranging in successional stages from annuals invading bare soil to more stable climax associations. Climax associations may regress to a sub-climax stage where fire, overgrazing, or land clearing activities occur. North slopes have cooler temperatures and better moisture relationships enabling vegetation to extend elevational ranges downward on these aspects. Soil characteristics, including depth, pH, parent material, temperature, and stage of development, exert their influences. Atmospheric factors, including temperature, precipitation, wind, and solar radiation, override the terrestrial factors.

ALPINE FORMATION

The Alpine formation includes those areas above timberline. At these latitudes, timberline is generally at an elevation of about 10,500 feet. The Tushar Mountains east of Beaver, Wasatch Plateau east of Sanpete Valley, and Fish Lake Plateau north of Fish Lake, include the only areas above timberline.

Precipitation is in excess of 35 inches annually, freezing temperatures occur nearly every month of the year, and growing seasons are short, averaging about 60 days. Strong winds and shallow soils contribute to a harsh environment.

^{1/}Ecological classification as described in "Plant Ecology", by John E. Weaver and Frederic E. Clements, 1938.

Table 1.--Ecological formations, climax associations, and sub-climax communities, Sevier River Basin

Ecological formation	North half	South half	Total
	<u>acres</u>	<u>acres</u>	<u>acres</u>
Alpine formation	4,480	9,630	14,110
Sub-alpine formation			
Spruce-fir association	21,520	67,420	88,940
Mixed upland herb association	5,690	-	5,690
Tall shrub communities	11,270	16,100	27,370
Low shrub communities	2,280	6,450	8,730
Grassland communities	<u>1,890</u>	<u>2,560</u>	<u>4,450</u>
Total	42,650	92,530	135,180
Montane forest formation			
Coniferous associations	66,120	301,850	367,970
Deciduous associations	101,130	210,960	312,090
Brushland communities	<u>21,080</u>	<u>30,700</u>	<u>51,780</u>
Total	188,330	543,510	731,840
Mountain shrub and pinyon-juniper upland formation			
Oakbrush association	324,760	493,160	817,920
Sagebrush association	216,800	302,630	519,430
Mountainmahogany association	-	1,200	1,200
Other mountain shrub communities	82,280	41,390	123,670
Pinyon-juniper association	<u>542,300</u>	<u>491,820</u>	<u>1,034,120</u>
Total	1,166,140	1,330,200	2,496,340
Semi-desert and phreatophyte formation			
Shadscale-greasewood communities	389,670	61,880	451,550
Winterfat-sagebrush communities	427,130	-	427,130
Alkali flat communities	170,230	1,690	171,920
Wet meadow community & phreatophytes	<u>192,990</u>	<u>16,790</u>	<u>209,780</u>
Total	1,180,020	80,360	1,260,380
Basin Total	2,581,620	2,056,230	4,637,850

Vegetation at these elevations is valuable for maintaining or improving the hydrologic condition of this productive water yielding area. About twenty inches of the 35 to 40 inches of precipitation is yielded as surface and ground water to the valleys below. Vegetation enhances the scenic quality of these alpine areas and furnishes a valuable summer food supply for livestock and wildlife. The unique coney rabbit inhabits this formation year-round.

Communities of pioneer vegetation include lichens on talus and rocks with forbs and grasses in pockets of gravel and on shallow soils. In other areas, ovalhead sedge (*Carex festivella*) and hood sedge (*Carex hoodii*) often predominate with some grasses. This association seems to characterize a climax. Excessive grazing has increased *Stipa*, and small forbs such as daisy (*Erigeron* spp.), avens (*Geum* spp.), cinquefoil (*Potentilla* spp.), pussytoes (*Antennaria* spp.), and Knotweed (*Polygonum* spp.). Trees and shrubs include alpine fir (*Abies lasiocarpa*), willow (*Salix* spp.), and wild gooseberry (*Ribes* spp.).

SUB-ALPINE FORMATION

Sub-alpine forests occupy an elevational zone from about 9,000 feet to timberline. Precipitation ranges from 25 to 35 inches annually. About 30 percent of the precipitation falls during the growing season and the balance during the winter months, generally as snow. The frost free period is commonly 60 days, from about June 20 to August 20.

Slopes range from moderately steep to steep. Soils are variable but under climax vegetation, dark colored A1 horizons, medium acid A2 horizons and strongly acid B2 horizons are typical. The formation occupies cool moist sites on the Wasatch Plateau, Tushar Mountains, Aquarius Plateau, Markagunt Plateau, and on the highest elevations of Monroe Mountain.

These areas are scenic with beautiful vistas of coniferous timber and open parks. Grazing is the most common use but recreation uses are becoming increasingly popular. Water yield is high, from 15 to 20 inches, and vegetation is valuable in maintaining good hydrologic conditions. Englemann spruce is the most valuable timber species with white fir utilized to a lesser extent.

SPRUCE-FIR ASSOCIATION

The abundance of Engelmann spruce (*Picea engelmannii*), alpine fir (*Abies lasiocarpa*), and white fir (*Abies concolor*) denote the typical climax within this association. Alpine fir is more abundant in the northern part of the Basin and white fir in the southern part. Moist cool sites are dominant; often this association will extend along stream courses or cold northern slopes to elevations as low as 8,000 feet.

Understory vegetation includes species suited to acidic soils such as gooseberry currant (*Ribes montigenum*), sedges (*Carex* spp.), columbine (*Aquilegia* spp.), heartleaf arnica (*Arnica cordifolia*), violet (*Viola* spp.), and bluntseed sweetroot (*Osmorhiza depauperata*).

Typical successional stages leading to the spruce-fir climax include open areas of grass which are slowly invaded by a fringe of quaking aspen (*Populus tremuloides*) which in turn is succeeded by shade tolerant spruce-fir. This example is typified on the Markagunt Plateau. Following fire, quaking aspen stands often thrive until spruce-fir stands are re-established.

MIXED UPLAND HERB ASSOCIATION

Lincoln Ellison^{1/} has identified a climax association of upland herbs on the Wasatch Plateau that occupy deep, well drained soils on sunny exposures. These soils are commonly neutral or basic and of limestone origin as compared to acidic soils under spruce-fir. The following forbs dominate this association: horsemint (*Agastache urticifolia*), Asters (*Aster* spp.), Oregon fleabane (*Erigeron speciosus*), Richardson geranium (*Geranium richardsonii*) and thistle (*Lathyrus lanszwertii*). Lambstongue fawnlily (*Erythronium grandiflorum*) is seen in abundance near melting snow banks. Grasses that are often present include slender wheatgrass (*Agropyron trachycaulum*), mountain brome (*Bromus marginatus*), tufted hairgrass (*Deschampsia caespitosa*), sedges (*Carex* spp.) and blue grasses (*Poa* spp.).

Tall Shrub Communities

The tall shrub communities generally occur on wet, cold, poorly drained soils and seem more adapted to the higher elevations within an association. Currants (*Ribes* spp.) and snowberry (*Symphoricarpos* spp.) are dominant with many associated forbs and grasses.

Low Shrub Communities

The low shrub communities are found on areas of shallow rocky and clay soils. Low sagebrush (*Artemisia arbuscula*) is the dominant species.

Grassland Communities

The grassland communities at these high elevations form mountain meadows common to the Aquarius and Markagunt Plateaus and extend to some extent throughout the zone. They vary widely in vegetal composition. Heavily grazed sheep range is often dominated by Letterman needlegrass (*Stipa lettermani*). Common dominants in the climax include

^{1/}Lincoln Ellison, "Sub Alpine Vegetation of the Wasatch Plateau Utah" Ecological Monographs 24:39-184, April 1954.

slender wheatgrass (*Agropyron trachycaulum*), bearded wheatgrass (*Agropyron subsecundum*), blue wildrye (*Elymus glaucus*), spike fescue (*Hesperochloa kingii*), mat muhly (*Muhlenbergia richardsonis*) and needleleaf sedge (*Carex eleocharis*).

MONTANE FOREST FORMATION

The Montane forest formation extends throughout the Basin at elevations between 7,500 and 9,000 feet. Deep, well drained, highly fertile soils are common under quaking aspen (*Populus tremuloides*) and less fertile soils under conifer. High humus content, deep litter and duff, and other factors commonly combine to form soils with high infiltration rates and water-holding capacities that yield limited surface runoff. Growing seasons are about 75 days in length. Precipitation ranges from 16 to 25 inches annually, with about 60 percent occurring during the winter months.

Water yields average 5 to 10 inches annually. Quaking aspen stands furnish some of the Basin's most productive summer livestock grazing. Conifer stands provide most of the sawtimber harvested. Ponderosa pine (*Pinus ponderosa*) yields about 26 million board feet of lumber annually. Quaking aspen bolts are shredded for excelsior or made into core stock used in manufacturing veneer panels. Most national forest recreational development is located within this formation and complements hunting and fishing activities.

CONIFEROUS ASSOCIATIONS

The conifer forest typified by Douglas fir (*Pseudotsuga menziesii*), white fir (*Abies concolor*), and Engelmann spruce (*Picea engelmannii*) is the climax vegetation. This association is more adapted to north and east than south or west topographic aspects. It is often associated with and succeeds quaking aspen or brushland areas. Extensive even-aged stands give evidence of past catastrophic environmental factors probably wild fire. Understory species include very sparse stands of shrubs, grasses, and forbs covering less than 5 percent of the surface. Most common shrubs are gooseberry currant (*Ribes montigenum*), ceanothus (*Ceanothus* spp.), Utah honeysuckle (*Lonicera utahensis*), and scarlet elderberry (*Sambucus pubens*). Sedges (*Carex* spp.) and Jones reedgrass (*Calamagrostis scopulorum*) are the most frequently found grasses and grass-like plants. Forbs usually found are Colorado columbine (*Aquilegia coerulea*), heartleaf arnica (*Arnica cordifolia*), Jacob's ladder (*Polemonium foliosissimum*), Canada violet (*Viola canadensis*), and silvery lupine (*Lupinus argenteus*).

In the south, montane forest is characterized by ponderosa pine (*Pinus ponderosa*). Ponderosa pine understory is frequently a grassland savanna that includes needleandthread (*Stipa comata*), spike fescue (*Hesperochloa kingii*), sandberg bluegrass (*Poa secunda*), and other species of grasses, forbs and shrubs.

DECIDUOUS ASSOCIATIONS

In some areas, quaking aspen (*Populus tremuloides*) is a climax species while in other areas it is obviously being succeeded by coniferous species. Understories of grasses and forbs often indicate stable quaking aspen stands. Forage often reaches production levels as high as 3,000 pounds, air dry weight, per acre. Understory grasses include bearded wheatgrass (*Agropyron subsecundum*), blue wildrye (*Elymus glaucus*), Thurber fescue (*Festuca thurberi*), sedges (*Carex* spp.), bluegrass (*Poa* spp.), Oniongrass (*Melica bulbosa*), mountain brome (*Bromus marginatus*), and nodding brome (*Bromus anomalus*). Forbs include edible valerian (*Valeriana edulis*), groundsel (*Senecio* spp.), common cowparsnip (*Heracleum lanatum*), geranium (*Geranium* spp.), aster (*Aster* spp.), larkspur (*delphinium* spp.), yarrow (*Achillea millefolium*), vetch (*Vicia* spp.), bluebells (*Mertensia* spp.), horsemint (*Agastache urtici-folia*), sweetroot (*Osmorhiza* spp.), and lomatium (*Lomatium* spp.). Shrub species include snowberry (*Symphoricarpos* spp.), elderberry (*Sambucus* spp.), big sagebrush (*Artemisia tridentata*), chokecherry (*Prunus virginiana*) and serviceberry (*Amelanchier alnifolia*).

At lower elevations, narrowleaf cottonwood (*Populus angustifolia*) follows stream course from the mountains to semi-desert basin valleys. Basin wildrye (*Elymus cinereus*), Kentucky bluegrass (*Poa pratensis*), and tufted hairgrass (*Deschampsia caespitosa*) are common associated grasses. Rose (*Rosa* spp.) and willows (*Salix* spp.) are also frequently found.

Brushland Communities

Communities of shrubs are interspersed with coniferous and deciduous associations. Common dominants are big sagebrush (*Artemisia tridentata*), silver sagebrush (*Artemisia cana*), or species of snowberry (*Symphoricarpos* spp.). Idaho fescue (*Festuca idahoensis*), slender wheatgrass (*Agropyron trachycaulum*), bluegrasses (*Poa* spp.), Mountain brome (*Bromus marginatus*), Letterman needlegrass (*Stipa lettermani*), sheep fescue (*Festuca ovina*), and oatgrass (*Danthonia* spp.) are associated with brush. Forbs are often abundant, and include species such as aster (*Aster* spp.), meadowrue (*Thalictrum* spp.), groundsels (*Senecio* spp.), yarrow (*Achillea millefolium*), and geranium (*Geranium* spp.).

MOUNTAIN SHRUB AND PINYON-JUNIPER UPLAND FORMATION

This formation includes a wide range of elevations, precipitation and soils. These factors are discussed with each association or community.

OAKBRUSH ASSOCIATION

The climate is cool in the Oakbrush association. Precipitation ranges from 14 to 20 inches annually and growing seasons are about 90 days in length. On drier south exposures, this association ranges upward to elevations over 8,000 feet. On the Wasatch Plateau, it forms a well defined elevational band at around 7,500 feet. Soils are generally deep, well drained and with high inherent fertility.

Water yield is less than 4 inches annually. Principal economic uses of the vegetation are forage for livestock and wildlife habitat.

Gambel oak (*Quercus gambelii*) is the dominant species forming almost pure stands on the Wasatch Plateau but intermixed with other shrub species at other locations. Common shrub constituents include big sagebrush (*Artemisia tridentata*), chokecherry (*Prunus virginiana*), serviceberry (*Amelanchier alnifolia*), mountain snowberry (*Symphoricarpos oreophilus*), squawapple (*Peraphyllum ramosissimum*), rabbitbrush (*Chrysothamnus* spp.), and antelope bitterbrush (*Purshia tridentata*). Grasses include needleandthread (*Stipa comata*), junegrass (*Koeleria cristata*), sandberg bluegrass (*Poa secunda*), bluebunch wheatgrass (*Agropyron spicatum*), and sedges (*Carex* spp.). Forbs include arrowleaf balsamroot (*Balsamorhiza sagittata*), asters (*Aster* spp.), eriogonum (*Eriogonum* spp.), vetches (*Vicia* spp.), peavine (*Lathyrus* spp.) wyethia (*Wyethia* spp.), lomatium (*Lomatium* spp.), lupine (*Lupinus* spp.), and helianthella (*Helianthella* spp.).

SAGEBRUSH ASSOCIATION

Sagebrush grows at every elevation. Above elevations of about 6,000 feet, most ecologists feel that sagebrush is a sub-climax community resulting from overgrazing and control of fire in recent years. At lower elevations, more stable climax associations exist.

Below about 6,000 feet elevation, consumptive use equals supply, resulting in little or no water yield. Vegetation is valuable for holding soil in place and for furnishing forage for livestock, big game, and other wildlife.

Big sagebrush (*Artemisia tridentata*) is the most common sagebrush and grows in all parts of the Basin up to about 10,000 feet elevation. Soils under big sagebrush are commonly deep and well drained. Rothrock sagebrush (*Artemisia tridentata rothrocki*) is a low sagebrush found at high elevations.

Silver sagebrush (*Artemisia cana*) grows on mountain slopes and plateaus at medium elevations. Black sagebrush (*Artemisia arbuscula nova*), sand sagebrush (*Artemisia filifolia*), and bud sagebrush (*Artemisia spinescens*) are desert loving sagebrushes at the lowest elevations.

MOUNTAINMAHOGANY ASSOCIATION

Curlleaf mountainmahogany (*Cercocarpus ledifolius*) grows at elevations from 7,000 to 9,000 feet. Soils are shallow to very shallow, cobbly or stony, and well drained. Warm sites on ridgetops and southern exposures are most common. Associated species are western wheatgrass (*Agropyron smithii*), Indian ricegrass (*Oryzopsis hymenoides*), and spike fescue (*Hesperochloa kingii*) as grasses, Arrowleaf balsamroot (*Balsamorhiza sagittata*) as a climax forb, and snowberry (*Symphoricarpos* spp.) as a climax shrub.

Other Mountain Shrub Communities

Mountain shrub communities often exist as a conglomerate of associations, and sometimes include additional species. Rocky-mountain maple (*Acer glabrum*), stansbury cliffrose (*Cowania mexicana stansburiana*), serviceberry (*Amelanchier alnifolia*), curlleaf mountainmahogany (*Cercocarpus ledifolius*), antelope bitterbrush (*Purshia tridentata*), and fourwing saltbrush (*Atriplex canescens*) are generally common constituents.

PINYON-JUNIPER ASSOCIATION

The dominant species, pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) grow at elevations of 5,000 to 6,500 feet. Precipitation ranges from 10 to 15 inches annually. Better soils on alluvial fans and other more productive sites support this association as well as some shallow, gravelly, and stony sites.

Consumptive water use usually equals water supply. Pinyon-juniper has extended its range due to the control of wild fire. The invasion of pinyon-juniper adversely affects forage production and the hydrologic relationships, such as sedimentation and runoff. The trees form a closed community by using most of the soil moisture available to vegetation and leaving large areas of unprotected soil. Type conversion of pinyon-juniper to grassland has been very successful on many sites in restoring forage and watershed protection.

Plant species commonly associated with pinyon-juniper include such grasses as needleandthread (*Stipa comata*), bottlebrush squirrel-tail (*Sitanion hystrix*), Indian ricegrass (*Oryzopsis hymenoides*), Western wheatgrass (*Agropyron smithii*), junegrass (*Koeleria cristata*), and bluebunch wheatgrass (*Agropyron spicatum*). Forbs include locoweed (*Astragalus* spp.) and Indian paintbrush (*Castilleja* spp.). Shrubs include big sagebrush (*Artemisia tridentata*), Stansbury cliffrose (*Cowania mexicana stansburiana*), horsebrush (*Tetradymia* spp.), rabbitbrush (*Chrysothamnus* spp.), and broom snakeweed (*Gutierrezia sarothrae*).

SEMI-DESERT AND PHREATOPHYTE FORMATION

The lowest elevation in the Basin is 4,550 feet; the Semi-Desert formation and most of the phreatophyte areas occur between this elevation and 5,550 feet. Precipitation is evenly distributed throughout the year but high evaporation rates in midsummer cause drought conditions. Precipitation is from 6 to 10 inches annually. Plant growth begins during March and continues until June when plants mature or go dormant from lack of available moisture. Frost free periods are more than 100 days. Slopes vary from almost level to rolling hills. Saline-alkali soils are common. Soils are mostly low in organic matter and many have a high silt or clay content. Waterholding capacity is high but infiltration rates are very low. The principal use of vegetation is livestock forage and wildlife habitat. These rangelands provide valuable winter grazing for livestock.

Shadscale-Greasewood Communities

Shadscale-greasewood communities occupy deep alkaline soils, many of which are saline-alkali. Individual areas are commonly dominated by a single species. Greasewood (*Sarcobatus vermiculatus*) or shadscale (*Atriplex confertifolia*) and Nuttall saltbush (*Atriplex nuttallii*) are generally the dominants. Associated species include alkali bluegrass (*Poa junicifolia*), Indian ricegrass (*Oryzopsis hymenoides*), and bottlebrush squirreltail (*Sitanion hystrix*). Forbs include globe-mallow (*Sphaeralcea* spp.), locoweed (*Astragalus* spp.), and annual weeds. Associated shrubs include horsebrush (*Tetradymia* spp.), rabbitbrush (*Chrysothamnus* spp.), and sagebrush (*Artemisia* spp.).

Winterfat-Sagebrush Communities

These communities occur on rolling hills and valley bottoms where soils have good drainage and growth is not inhibited by high salinity or alkali. Winterfat (*Eurotia lanata*) is highly palatable to cattle and sheep on winter ranges. Because of heavy grazing, it is now a minor component of most of the Semi-Desert formation.

Big sagebrush (*Artemisia tridentata*) and black sagebrush (*Artemisia arbuscula nova*) are often associated with bluebunch wheatgrass (*Agropyron spicatum*), Indian ricegrass (*Oryzopsis hymenoides*), needle-andthread (*Stipa comata*), blue grama (*Bouteloua gracilis*), and galleta grass (*Hilaria jamesii*). Forbs are usually a minor component of the vegetation.

Half shrub communities occupy more shallow soils and include Wright eriogonum (*Eriogonum wrightii*), broom snakeweed (*Gutierrezia sarothrae*), golden weed (*Haplopappus* spp.), and gray molly (*Kochia americana*).

Alkali Flat Communities

Alkali flats vary in vegetative cover depending on the presence or absence of a high water table. Salt meadows growing over a water table within 20 inches of the surface exhibit much the same characteristics as the wet meadows. High salt concentrations inhibit plant growth, and grasses are often interspersed with barren saline-alkali soil.

Where the high water table is absent, the most frequently found species of grasses are: alkali sacaton (*Sporobolus airoides*), alkali bluegrass (*Poa junicifolia*), bottlebrush squirreltail (*Sitanion hystrix*), and beardless wildrye (*Elymus triticoides*). Often, the dominant grass is saltgrass (*Distichlis stricta*). Pickleweed (*Allenrolfea occidentalis*), smotherweed (*Bassia hyssopifolia*), and globemallow (*Sphaeralcea* spp.) are somewhat common forbs.

Wet Meadow Community and Phreatophytes

Soils of wet meadows are deep and affected by a water table that is always within the root zone. They are commonly poorly drained and high in organic matter.

Dominant vegetation gives the wet meadows a grasslike aspect although in some areas silver buffaloberry (*Shepherdia argentea*), Russian olive (*Elaeagnus angustifolia*), and tamarisk (*Tamarix pentandra*) are invading. Principal grasses and grasslike species include sedges (*Carex* spp.), rush (*Juncus* spp.), bulrush (*Scirpus* spp.), saltgrass (*Distichlis stricta*), spikerush (*Eleocharis* spp.), spike redtop (*Agrostis exarata*), redtop (*Agrostis alba*), and timothy (*Phleum pratense*).

Table 2.--Portion of wetlands dominated by various kinds of vegetation,
Sevier River Basin, 1962

Vegetation	Subbasin						Weighted total
	A	B	C	D	E	F	
	- - - - -	- - - - -	- - - - -	- - - - -	percent	- - - - -	- - - - -
Meadows	65	4	48	29	84	76	32
Saltgrass	17	50	31	52	5	19	37
Big sagebrush	0	1	0	0	1	0	1
Willows	0	0	1	3	5	2	1
Pickleweed	0	17	0	0	0	0	8
Greasewood	18	27	11	10	0	0	19
Tamarisk	0	0	9	0	0	0	1
Tules	0	0	0	1	1	0	0
Rabbitbrush	0	1	0	0	3	3	1
Broadleaf trees	0	0	0	4	1	0	0
Total (acres)	46,640	97,920	22,240	17,190	8,590	9,480	202,060

Chapter III

C R O P L A N D

There are about 490,000 acres of cropland in the Basin. Of this total, 370,850 acres are within the water-budget areas. The remaining 119,150 acres are dryland areas in Subbasins A and B used primarily for grain production. The land use in the water-budget areas is shown in Table 3.

IRRIGATED CROPLAND

The irrigated areas cover 260,730 acres, 236,530 acres irrigated rotated and 24,200 acres irrigated nonrotated. The irrigated land cropping pattern is oriented around the livestock industry.

About two-thirds of the irrigated-rotated cropland produces alfalfa and one-fourth produces small grain. The remainder produces row crops or pasture or is left idle, either in a rotation system or because of water shortages. Most of the alfalfa is harvested for hay. About 20,000 acres is managed to produce one cutting of hay followed by a seed crop and about 10,000 acres are used to produce only alfalfa seed. Production of alfalfa seed is confined to Subbasin B. Row crops grown are about one-half corn silage and one-half sugar beets and potatoes. The irrigated rotation cropping patterns are shown in Table 4.

The cropping pattern varies between Subbasins. In Subbasin A, a typical rotation consists of alfalfa, 8 to 10 years; small grains, three years; and corn silage, one year. In Subbasins B and C, it is alfalfa, 6 to 8 years; small grains, 2 years; and a row crop, one year. In Subbasin D, a typical rotation is alfalfa, 6 to 8 years; small grain, 2 to 3 years; and corn silage, one year. Sugar beet acreage in Subbasins C and D has declined rapidly since this survey was taken. In Subbasins E and F, the typical rotation consists of alfalfa, 10 to 12 years; and small grains, 2 or 3 years, with an occasional crop of potatoes.

The irrigated nonrotated cropland is primarily native vegetation used for pasture. Most of these areas are both surface and sub-irrigated. The better native meadows are located where water tables are between 2 and 5 feet below the ground surface. The vegetation is primarily sedges (*Carex*, spp.). The less productive native pastures are mostly saltgrass (*Distichlis stricta*) with more alkali problem areas.

TABLE 3.--Land use by water-budget area, Sevier River Basin, 1962

Water-budget area	Irrigated cropland		Nonirrigated lands			Miscellaneous areas		Major reservoirs	Total
	Rotated	Nonrotated	Wet meadows	Dryland	Phreatophytes	Bare ground	Water surfaces		
	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres
A-1	24,770		14,070		1,320	2,270	650		43,080
A-2	7,940	1,120	10,120		1,920	700	400		21,200
A-3	10,350		3,530		570	700	200		15,350
A-4	6,580		9,940		3,110	860	420		20,910
Total	49,640		37,660		6,920	4,650	1,670		100,540
B-1	3,910			1,310		320	60		5,600
B-2	2,750	1,120	1,360	610	2,040	210	130	510	8,730
B-3			1,420		1,860	70	120		3,470
B-4	3,730		1,480	2,110	420	280	50	1,190	9,260
B-5	6,900		1,540		2,360	1,310	330	640	13,080
B-6	5,630		2,150		5,620	2,320	160		15,880
B-7	57,930		37,120		81,250	21,150	650	1,990	200,090
Total	80,850	1,120	45,070	4,030	93,550	25,660	1,500	4,330	256,110
C-1	2,440	2,650	4,050		640	290	250		16,560
C-2	15,490	2,610	2,600		1,740	700	490		23,630
C-3	15,160	1,400	1,310		540	820	200	1,360	20,790
C-4	1,260	60			410	40	30		1,800
C-5	1,990	1,440	480		590	310	90		4,900
C-6	2,020	50	90		210	40	30		2,440
Total	38,360	8,210	8,530		4,130	2,200	1,090	7,600	70,120
D-1	19,880	3,340	1,020		390	1,370	560		26,560
D-2	1,320	610	3,980		260	140	140		6,450
D-3	270	80	240			80			670
D-4	10,960	380	220		1,310	710	130		13,710
D-5	750				190	20	10		970
D-6	410	640	400		60	10	20		1,540
D-7	2,470	690	980		660	110	70		4,980
D-8	2,260	300	430		340	120	30	1,940	5,420
Total	38,320	6,040	7,270		3,210	2,560	960	1,940	60,300
E-1	5,220	2,840	2,830		210	170	80	400	11,750
E-2	830		190		170	20	20	2,200	3,430
E-3	2,550	1,190	420		650	50	100		4,960
E-4	1,250	550	120		220	10	110		2,260
E-5	2,870	260	30		280	70	60	170	3,740
Total	12,720	4,840	3,590		1,530	320	370	2,770	26,140
F-1	4,580	1,680	1,160		510	190	80		8,200
F-2	5,460	740	1,900		270	50	200		8,620
F-3	4,470	480	570		100	380	90		6,090
F-4	730	230	140		290		80		1,470
F-5	1,400	860	200		200	50	60		2,770
Total	16,640	3,990	3,970		1,370	670	510		27,150
GRAND TOTAL	236,530	24,200	106,090	4,030	110,710	36,060	6,100	16,640	540,360

NONIRRIGATED CROPLAND

The nonirrigated cropland areas cover about 229,270 acres with 110,120 acres included in the water-budget areas. Of that portion in the water-budget areas, 106,090 acres are wet meadows and 4,030 acres are dryland. The balance of the nonirrigated cropland is dryland used to produce small grain, principally wheat.

The wet meadows are used for pasture with some wild hay harvested where conditions permit. These lands vary considerably in quality depending on soil and water table conditions. Small annual investments are required to maintain production but the resulting returns are comparably small. Most farmers feel investment of large amounts of capital would not produce sufficient return to make it worthwhile. However, fertilization, proper management, and installation of structural measures in selected locations could increase yields considerably.

Dryland cropping practices consist essentially of a wheat-fallow rotation pattern. With this practice, the land is generally plowed in the spring, weeded during the summer, seeded in the fall, and harvested the following summer. This allows most of the moisture accumulating during the winter following harvest to be stored in the soil for use the following year. Dryland farming is not too successful in areas where the annual precipitation is less than 12 inches.

Table 4.--Irrigated rotated cropland use, Sevier River Basin

Watershed		Alfalfa	Small grain	Corn	Potatoes	Sugar beets	Pasture	Total irrigated cropland ^a
		acres	acres	acres	acres	acres	acres	acres
A-1	North Sanpete	18,570	5,700	500				24,770
A-2	Fountain Green	5,960	1,820	160				7,940
A-3	Ephraim	7,760	2,380	210				10,350
A-4	Manti	4,940	1,510	130				6,580
Subbasin A		37,230	11,410	1,000				49,640
B-1	Levan	2,610	1,300	0				3,910
B-2A	Above Chicken Creek	1,390	460	0				1,850
B-2B	Mills	670	230	0				900
B-4	Scipio	2,980	750	0				3,730
B-5	Lyndyll-Oak City	4,560	1,730	350	130	130		6,900
B-6	McCormick-Holden	3,830	1,410	280	110	0		5,630
B-7	Delta	32,660	16,030	4,310	0	3,080	1,850	57,930
Subbasin B		48,700	21,910	4,940	240	3,210	1,850	80,850
C-1	Fayette	1,620	480	160		180		2,440
C-2	Redmond	10,070	3,100	1,080		1,240		15,490
C-3	Gunnison	10,350	3,240	730		840		15,160
C-4	Willow Creek	820	250	90		100		1,260
C-5	Salina Creek	1,290	400	140		160		1,990
C-6	Lost Creek	1,320	400	140		160		2,020
Subbasin C		25,470	7,870	2,340		2,680	0	38,360
D-1	Richfield	11,330	5,370	1,590		1,190	400	19,880
D-2	Venice	750	360	100		80	30	1,320
D-3	Glenwood	150	70	20		20	10	270
D-4	Annabella	6,250	2,960	870		660	220	10,960
D-5	Clear Creek	430	200	60		50	10	750
D-6	Manning Creek	300	80	20	10	0	0	410
D-7	Marysvale	1,800	470	120	80	0	0	2,470
D-8	Junction	1,630	410	110	70	0	40	2,260
Subbasin D		22,640	9,920	2,890	160	2,000	710	38,320
E-1	Koosharem	3,920	1,040		260			5,220
E-2	Greenwich-Angle	560	150		120			830
E-3	Antimony	1,710	460		380			2,550
E-4	John's Valley	490	660		100			1,250
E-5A	Bryce Valley	2,510 ^b	150	60	0		150	2,870
Subbasin E		9,190	2,460	60	860	0	150	12,720
F-1	Circleville	3,210	820	180	370		0	4,580
F-2	Panguitch Valley	4,090	1,020				350	5,460
F-3	Panguitch	3,340	840				290	4,470
F-4	Hillsdale	260	60				410	730
F-5	Hatch	880	220				300	1,400
Subbasin F		11,780	2,960	180	370	0	1,350	16,640
Basin total		155,010	56,530	11,410	1,630	7,890	4,060	236,530
Percent of total		65	24	5	1	3	2	100

^aIdle land excluded^bIncludes orchards

Source: Appendix IV, Water Budget Analysis, Tables 5 to 40

Chapter IV

P H R E A T O P H Y T E S U R V E Y

The phreatophyte survey was conducted during the spring and summer of 1962. The survey data was recorded on aerial photograph contact prints and then transferred to line maps.

The survey consisted of delineating the soils into 6 groups according to the physical characteristics. Depths to water table were divided into 3 groups and the kinds of vegetation were classified into 12 groups. Vegetative density was shown from 0.1 to 1.0; 1.0 being equal to a heavy, complete cover of Kentucky bluegrass sod. Each delineation on the map carried two composite symbols; one for soil and water table, and one for kind of vegetation and density.

Existing soils information was used where available; if not, a spade and soil auger were used to investigate the soil to a depth of 5 feet or more. The data were determined by walking or riding over the area to be mapped.

The symbols shown in the mapping legend are used in combination on the left hand side and across the top of the following tables (Table 5). Symbols on the left hand side show density and type of vegetation or phreatophyte. The vegetative or phreatophyte symbol such as P2 or P24 follows the density number. The dominant phreatophyte is placed first. For example, cottonwood trees with a saltgrass understory, F10 - P2S. Ordinarily, big sagebrush, P4; greasewood, P14; and rabbitbrush, P24 do not grow where the water table is near the surface, but were mapped in connection with wetlands only where they were immediately adjacent to it.

The soils and water table condition is indicated at the top of the table. For example 10W2 is medium or moderately coarse soil underlain by gravel 10-36" with a water table generally between 12 and 36 inches during the growing season.

Consumptive use of water by phreatophytes for each water table condition is shown in the columns on the right hand side. The figures show consumptive use in inches of water for the growing season.

The mapping units shown on the following maps are delineated by vegetative units. The types of phreatophytic vegetation and irrigated lands are divided by dashed lines within the soil type delineations. The mapping legend is shown below.

Any area that is considered for drainage and improvement through seeding where phreatophytic vegetation now grows would require detailed soils investigation and probably some laboratory analysis. For this reason, salinity and alkali were not mapped. More important factors to consider, if phreatophyte control measures are undertaken, are soil moisture, stage of current year's growth, streambank erosion, wildlife habitat, aesthetics, effectiveness of alternative methods, and economic feasibility.

MAPPING LEGEND

SOILS

- 01 Undifferentiated wetlands, ox bows, etc., dominantly fine or moderately fine textured.
- 06 Undifferentiated wetland, ox bows, etc., dominantly medium to coarse textured or gravelly.
- 10 Medium or moderately coarse soils underlain by gravel 10-36" (shallow-moderately deep).
- 11 Deep dominantly fine textured, heavy clay loams or clays.
- 23 Deep dominantly medium and moderately fine textured, fine sandy loam to clay loam.
- 45 Deep dominantly coarse textured coarse sandy loam to sand.
- T Peat. These are soils of high organic materials and low mineral content, commonly called bog soils.

WATER TABLES

- W1 Water table generally below 36 inches during the growing season.
- W2 Water table generally between 12 and 36 inches during the growing season.
- W3 Water table generally near the surface to 12 inches during the growing season.
- W Wet spots, water generally at the surface. One symbol represents 0.5 to 1 acre.

VEGETATION

- P2 Meadows, wiregrass, broadleaf, etc.
- P2S Meadows, saltgrass
- P4 Big sagebrush
- P5 Willows, etc.
- P6 Silver buffaloberry
- P14 Greasewood
- P19 Tamarisk
- P20 Tules, bulrushes, etc.
- P24 Rabbitbrush (rubber)
- F10 Broadleaf trees, cottonwood trees, etc.
- L Irrigated cultivated land
- dL Nonirrigated cultivated dryland

Table 5.--Phreatophyte areas by vegetation density, soil, water table, and consumptive use of water, Sevier River Basin, 1962

Phreatophyte density and type	Soil and water table condition												Growing season consumptive use		
	06W2						06W3						Water table condition		
	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	W1 Inches	W2 Inches	W3 Inches
Subbasin A															
Watershed A-1															
.4P2															35.83
.5P2														22.80	35.83
.6P2														22.80	35.83
.7P2															35.83
.8P2															35.83
.5P2 - .1P10															36.96
.5P2 - .1P5														26.10	36.96
.6P2 - .1P5														25.63	36.80
.5P2s															35.83
.1P14 - .14P2s															40.01
.2P14 - .14P2s															42.79
.4P5 - .1P14															45.45
.2P14															
.1P24															
.1P14 - .1P24															
Riparian (Miles)													12.20	12.20	56.75
TOTAL Watershed A-1													12.20	30.39	56.75
															42.62
Watershed A-2															
.3P2															35.83
.6P2														22.80	35.83
.7P2														22.80	35.83
.2P2 - .3P2s															35.83
.2P2 - .4P2s															35.83
.4P2s															35.83
.5P2s															35.83
.6P2s															
.1P2s - .2P14															40.01
.4P2s - .1P14															
.1P14															
.2P14															
.1P14 - .1P24															
.14P5 - .1P14															
Riparian (Miles)													12.80	12.20	45.45
TOTAL Watershed A-2													12.20	12.20	42.62

Table 5 continued

Phreatophyte density and type	Soil and water table condition																		Growing season consumptive use																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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cres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres

Table 5 continued

Phreatophyte density and type	Soil and water table condition												Growing season consumptive use					
													Water table condition					
	01W1 Acres	01W2 Acres	01W3 Acres	06W Acres	06W1 Acres	06W2 Acres	06W3 Acres	11W1 Acres	11W2 Acres	11W3 Acres	23W1 Acres	23W2 Acres	23W3 Acres	Total Acres	W Inches	W1 Inches	W2 Inches	W3 Inches
Subbasin B																		
N O P H R E A T O P H Y T E S																		
Watershed B-1																		
Watershed B-2																		
.7P2s									690			100		790			25.08	
.8P2s			100									360		460			25.08	39.71
.5P4								250						250		14.14		
.3P13									210		120			330		14.14		
.4P14											150			150		14.14		
.4P24											120			120		14.14		
.3P14, .2P2s, .1P24											60			60		14.54		
.4P24, .1P4, .1P2s											180			180		14.34		
.3P24, .1P4, .1P2s											200			200		14.38		
.3P4, .2P24, .1P2s	60													60		14.34		
.4P2s, .1P24	130													130		15.09		
.3P24, .1P4, .2P2s	40		400								350			390	61.00	14.54		
.1P2s, .6P20								50			190			400		14.54		
.4P24, .2P2s									140					240			28.40	
.3P2s, .2P13										570				140				39.71
.4P2s, .4P2											20			570				
.6P2s, .1P24														20		15.16		
.4P2s, .1P13												40		40			26.74	
TOTAL Watershed B-2	230		500					300	1040	570	1390	500		4530				
Watershed B-3																		
.6P24																14.14		
.4P2s, .1P19											110			110			31.68	
.4P2s, .1P24	740					110								110				
.5P2s, .1P24						160								740		15.09		
.4P4, .1P2					60									160			26.46	
.3P14, .1P13								370						60		14.38		
.5P24, .1P4					10									370		14.14		
.3P4, .2P24, .2P2s					240									10		14.14		
.4P2s, .1P19, .1P24					120									240		14.48		
.2P4, .2P24, .2P2s	370													120		22.26		
.2P2s, .1P4, .3P24	730													370		14.54		
.3P14, .2P2s, .1P24														730		14.54		
.3P4, .2P24, .1P2s	40										10			10		14.54		
TOTAL Watershed B-3	1880				430	270		370			120			3070		14.34		

Table 5 continued

Phreatophyte density and type	Soil and water table condition												Growing season consumptive use		
	O1W			O1W2			O1W3			O6W2			Water table condition		
	Acres	O1W1 Acres	O1W2 Acres	O1W3 Acres	O6W1 Acres	O6W2 Acres	11W Acres	11W1 Acres	11W2 Acres	11W3 Acres	23W Acres	23W1 Acres	23W2 Acres	23W3 Acres	Total Acres
Subbasin B continued															
Watershed B-7															
.2P2s						1000									1000
.3P2s				450											450
.2P2, .3P2s					160										160
.2P2s, .1P14			30												1050
.2P2s, .1P13				1270											1270
.1P2s, .1P13															1060
.2P2s, .3P14					1800										3560
.2P2s, .1P19	580	1760													10
.2P2s, .1P14		10	1390							450					1840
.4P2s, .1P19			3570	1680											3570
.1P13							6960								8640
.2P13							5680								5680
.2P14							4820								4820
.3P14							11840								11840
.1P14, .4P2s, .1P2								480	680						1640
.2P2s, .1P13, 10% Sand Dunes									18280						18280
.3P14, .1P13					600		6620								6620
.2P2s, .2P14, .2P19															600
.1P13, .1P2s, 15% Sand Dunes							1540								1540
TOTAL Watershed B-7	580	1770	4990	3400	2560	39960	480	19410							73150
GRAND TOTAL SUBBASIN "B"															
	580	5000	4990	3900	7220	270	39960	1150	20450	570	4800	6110	2510	410	97920

Table 5 continued

Phreatophyte density and type	Soil and water table condition					Growing season consumptive use			
	W1		W2		Total Acres	Water table condition		W	Inches
	Acres	Acres	Acres	Acres		Inches	Inches		
Subbasin C									
Watershed C-1									
P2		410	2600		3010				
P2s	80	2060	1980		4120				
P4		20			20		14.60	23.90	37.85
P14	20	100			120		13.90	31.98	37.85
P19									
TOTAL Watershed C-1	100	2590	4580		1140	55.79			
Watershed C-2									
P2	620	1810	1220		3650		14.60	23.90	37.85
P2s	330	640	1000		1970		14.60	23.90	37.85
P14	430	500			930		13.90	31.98	
P19					260				
TOTAL Watershed C-2	1380	2950	2220		260	55.79			
Watershed C-3									
P2	270	1180	650		2100				
P2s	60	360	350		770				
P14	210	60			270				
P19					180				
P5-F10					100				
TOTAL Watershed C-3	540	1600	1000		280				
Watershed C-4									
P2	60				60		14.60		
P14	420				420		13.90		
P19					170				
TOTAL Watershed C-4	480				170	55.79			
Watershed C-5									
P2	1170	420	380		1970		14.60	23.90	37.85
P2s		80			80				
P14	430				430		13.90		
P19					110				
TOTAL Watershed C-5	1600	500	380		110	55.79			
Watershed C-6									
P2	20	50	80		150		14.60	23.90	37.85
P5					20				
P14	170	20			190				
TOTAL Watershed C-6	190	70	80		20		13.90	31.98	
GRAND TOTAL SUBBASIN "C"	4290	7710	8260		1980				

Table 5 continued

Phreatophyte density and type	Soil and water table condition					Growing season consumptive use			
	W1		W2		Total Acres	W Inches	Water table condition		W3 Inches
	Acres	Acres	Acres	Acres			W1 Inches	W2 Inches	
Subbasin D									
<u>Watershed D-1</u>									
P2	520	250	220		990		14.65	23.96	37.94
P2s	310	3080	60		3450		14.65	23.96	37.94
P5				70	70	44.93			
P14	140	180			320		12.75	31.76	
P5-F10				10	10	44.93			
TOTAL Watershed D-1	970	3510	280	80	4840				
<u>Watershed D-2</u>									
P2	150	390	40		580		14.65	23.96	37.94
P2s		230	3900		4130			23.96	37.94
P14	120	150			270		12.75	31.76	
TOTAL Watershed D-2	270	770	3940		4980				
<u>Watershed D-3</u>									
P2		110			110			23.96	
P2s			210		210				37.94
TOTAL Watershed D-3		110	210		320				
<u>Watershed D-4</u>									
P2	200	180	170		550		14.65	23.96	37.94
P2s		200			200			23.96	
P5				90	90	44.93			
P14	1090	10			1100		12.75	31.76	
F10-P5				220	220	44.93			
TOTAL Watershed D-4	1290	390	170	310	2160				
<u>Watershed D-5</u>									
P5-F10				190	190	44.93			
TOTAL Watershed D-5				190	190				
<u>Watershed D-6</u>									
P2	60	490	280		830		14.04	22.99	36.38
P2s	240				240		14.04		
P5-F10				60	60	43.23			
TOTAL Watershed D-6	300	490	280	60	1130				

Table 5 continued

Phreatophyte density and type	Soil and water table condition					Growing season consumptive use			
	W1 Acres	W2 Acres	W3 Acres	W Acres	Total Acres	Water table condition			
						W Inches	W1 Inches	W2 Inches	W3 Inches
Subbasin D continued									
<u>Watershed D-7</u>									
P2	70	840	720		1630				
P2s			80		80				
P14	10				10				
P5-F10				60	60				
P5				40	40				
P20				160	160				
F10				400	400				
TOTAL Watershed D-7	80	840	800	660	2380				
GRAND TOTAL Watersheds D-1 through D-7									
	2910	6110	5680	1300	16000				

Phreatophyte density and type	Soil and water table condition												Growing season consumptive use																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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	06W1		06W2		06W3		10W1		10W2		10W3		11W1		11W2		11W3		23W1		23W2		23W3		Total	W	W1	W2	W3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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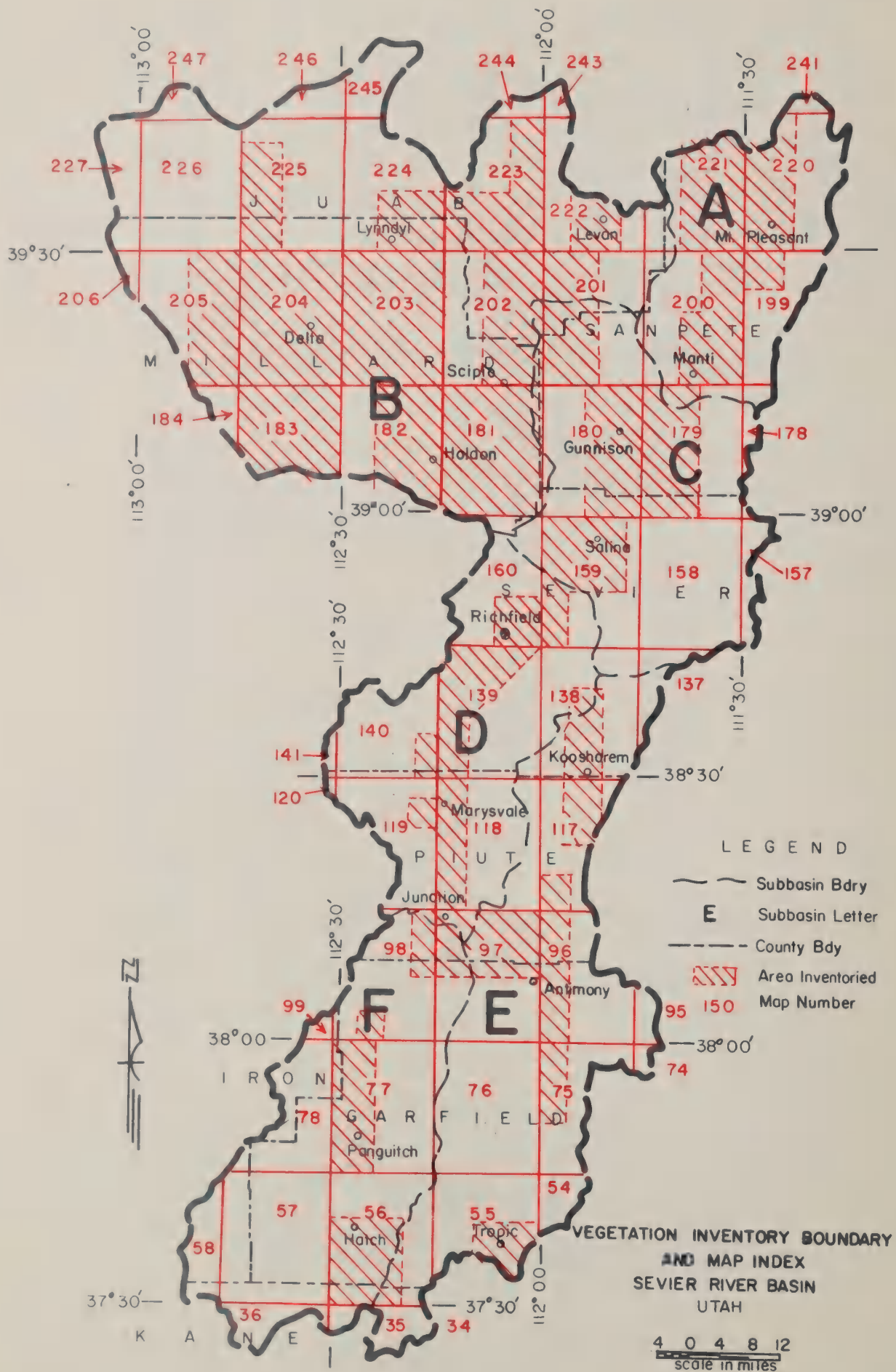
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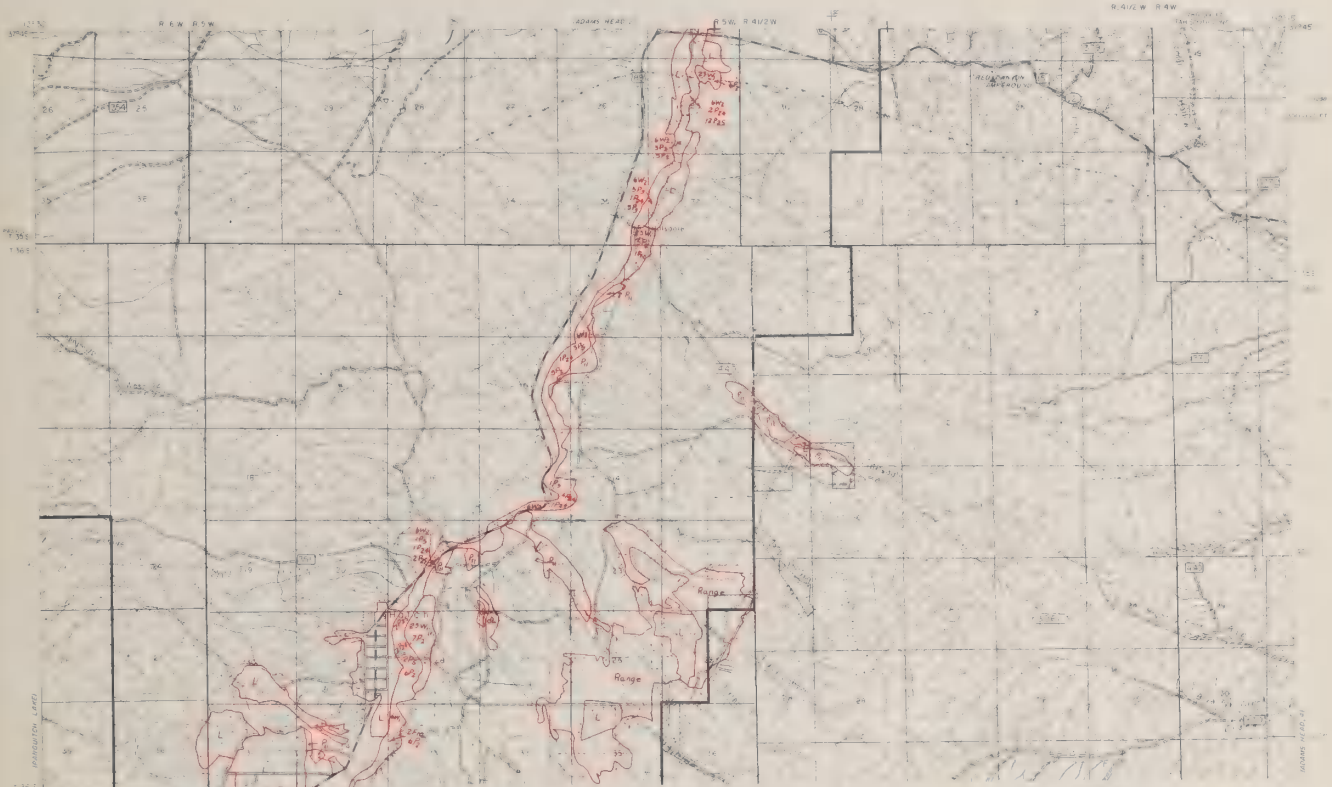
[illegible]

Table 5 continued

Phreatophyte density and type	Soil and water table condition												Growing season consumptive use				
	Water table condition												Water table condition				
	06W1 Acres	06W2 Acres	06W3 Acres	10W1 Acres	10W2 Acres	10W3 Acres	11W1 Acres	11W2 Acres	11W3 Acres	23W1 Acres	23W2 Acres	23W3 Acres	Total Acres	W Inches	W1 Inches	W2 Inches	W3 Inches
Subbasin F continued																	
Watershed F-2																	
.5P2			220							10			230		11.71		28.27
.6P2		90						50		180	140	20	480		11.71	18.22	28.27
.7P2			30						280	130	40		480		11.71	18.22	28.27
.8P2											240		240			18.22	
.3P2s											50		50			18.22	
.5P2s								60					60			18.22	
.2P2s - .2P24		130								40			170		11.71	21.24	
.2P2s - .1P6		20											20			20.24	
.3P2 - .1P6		80	110										190			19.73	32.40
.4P2 - .1P6 - .1P4		290	80										370			20.24	33.78
.4P2 - .1P4		300											300			19.43	
.2P2s - .1P5			70										70				30.05
.1P5 - .1P24			40										40				39.20
.1P24 - .2F10		20											20			19.43	
.4P2 - .1P6		120											120			27.46	
.4P24 - .2F10		90											90				
.3F10 - .2P2		20											20				
Riparian (Miles)																	
TOTAL Watershed F-2	1160	550						110	280	360	470	20	2950	33.61			
													(3.8 Mi.)				
Watershed F-3																	
.5P2			30										30				28.27
.6P2											20	80	100			18.22	28.27
.7P2			30						170		410		610			18.22	28.27
.8P2									120		30		150			18.22	28.27
.2P2s											30		30			18.22	
.3P2s									40		20		60			18.22	28.27
.2P2 - .3F10		50											50				
.3P2 - .1P6		40	110										150			19.73	32.40
.4P2 - .1P6		20											20			19.43	
.2P2s - .1P6		30											30			20.24	
.3P2 - .1P6 - .1P14			30														
TOTAL Watershed F-3	140	200							330		510	80	1260				34.88

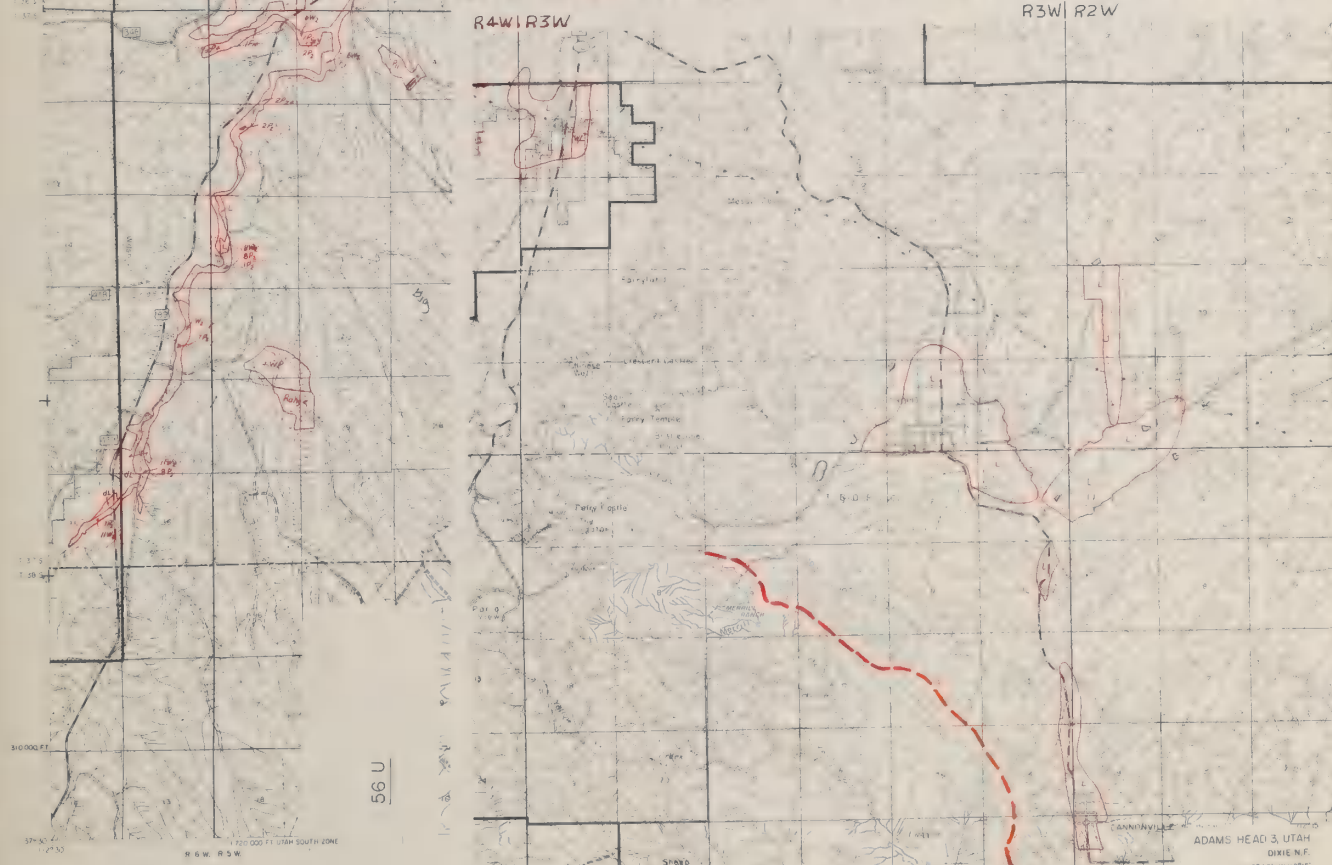
Phreatophyte density and type	Soil and water table condition											Growing season consumptive use					
												Water table condition					
	06W1 Acres	06W2 Acres	06W3 Acres	10W1 Acres	10W2 Acres	10W3 Acres	11W1 Acres	11W2 Acres	11W3 Acres	23W1 Acres	23W2 Acres	23W3 Acres	Total Acres	W Inches	W1 Inches	W2 Inches	W3 Inches
Subbasin F continued																	
Watershed F-4																	
.6P2																	
.5P2 - .1F10															11.31		
.2P24 - .7P2s		150													15.42		
.2P2, .2P24, .2P2s		50														18.59	
.2P2s, .1P5, .1P24		50														19.24	
.3P2, .5P5, .1P24		70														22.39	
.4P2s, .1P5, .1P24		140												26.02			
.5P2, .3P5, .1P24		210														20.69	
TOTAL Watershed F-4		670								110						22.79	
Watershed F-5																	
.6P2																	
.7P2										60						17.31	
.8P2										210					11.31	17.31	
.2P2 - .1P5		40								140					11.31	17.31	
.2P2 - .2P24		140									110	210				22.15	
.3P2 - .1P24		80														20.20	
.6P2 - .2P5		70														18.75	
.6P2 - .2F10		70													16.44		
.2P2s - .2P24		10	30												16.44		
.1P4 - .1F10		40													11.31	20.21	
.2P2s - .1P5 - .1P24		20												27.47			
TOTAL Watershed F-5	170	330								410	210	210				19.38	
GRAND TOTAL SUBBASIN "F"																	
	170	2620	750		110					1360	610	740	2770	350			9480





R4W R3W

R3W R2W

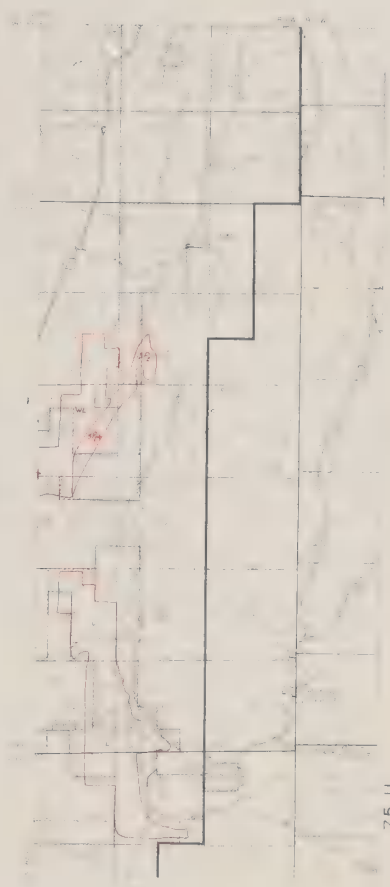


56 U

56 U

USGS Photometric Series Map
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 From 1:60,000 Photographs Dated 1953
 Original Projection: UTM
 Contour Interval: 100'

ADAMS HEAD 3, UTAH
 DIXIE N.E.
 N 37° 30' W 12° 15'


$$\frac{75}{u}$$

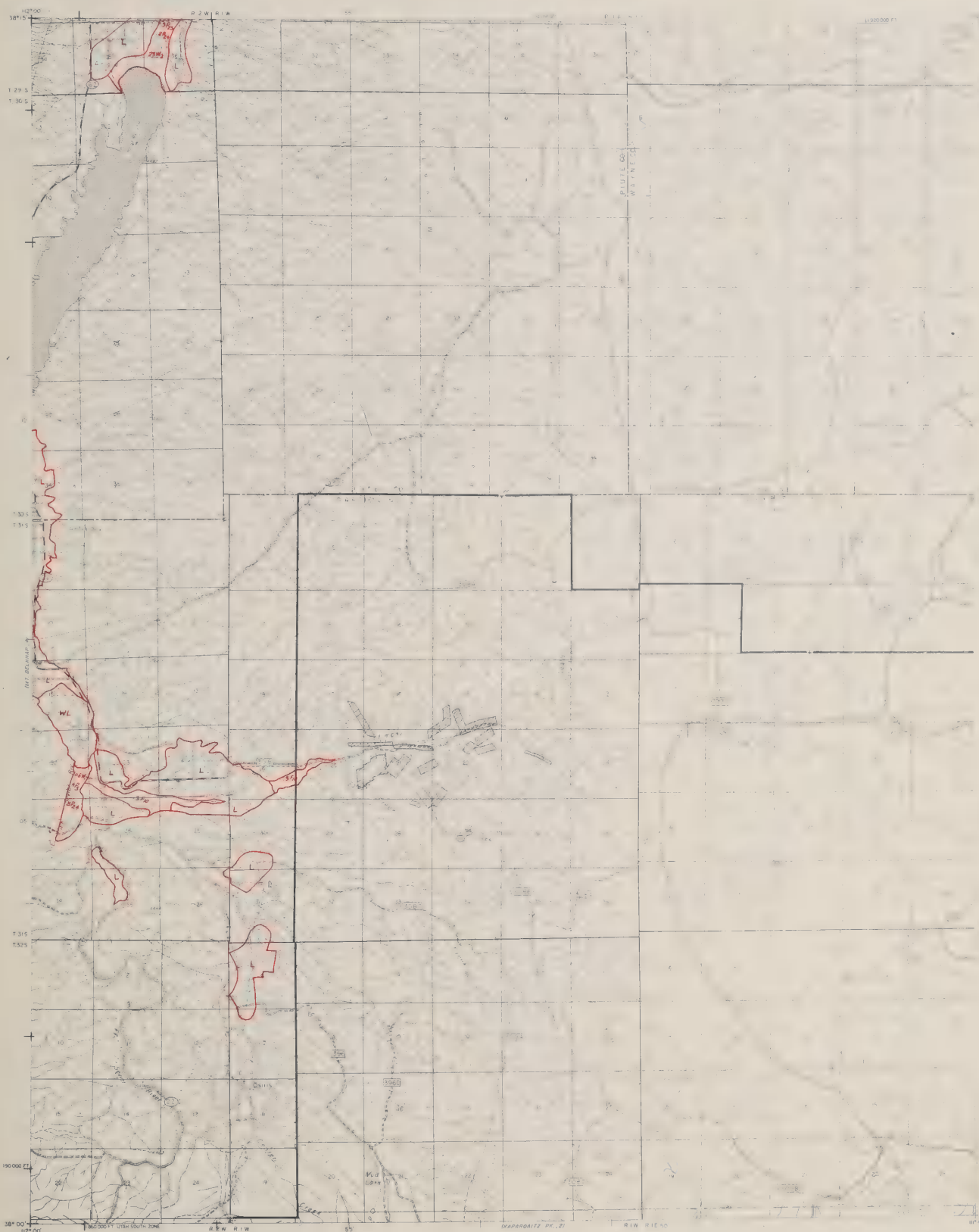
USFS Planimetric Series Map
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Edited and Revised 1961

75A

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Sheet 12 16

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USPS Planning Series Map
Construction by Photogrammetric Methods
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Photocopy Projection, 1957 1:60,000
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75A

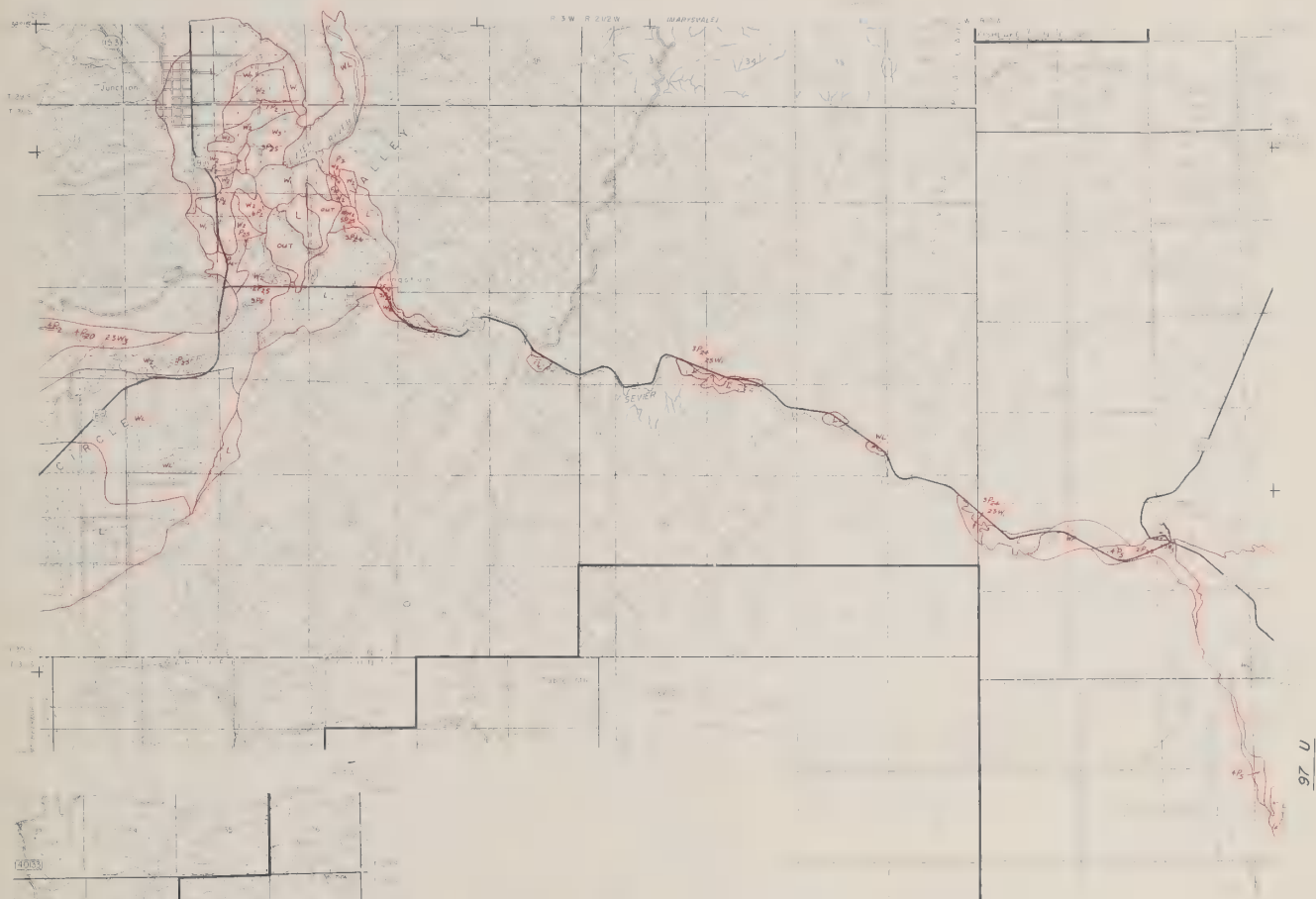
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This map complies with the requirements for planning series maps.

16A

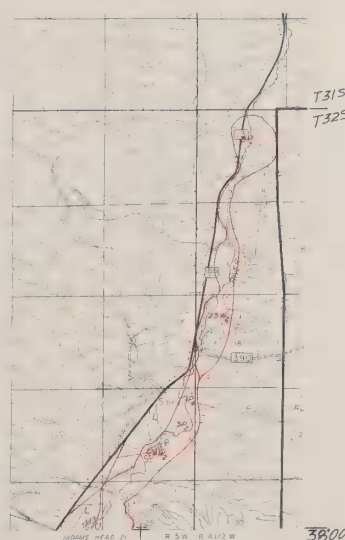
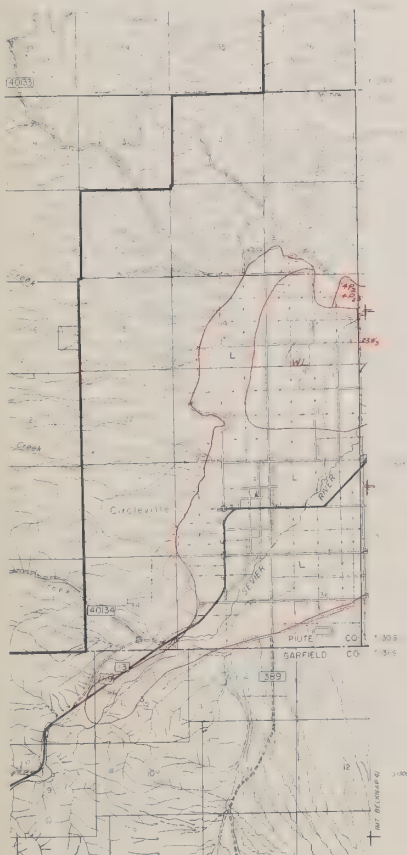
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DIXIE NF
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96 U

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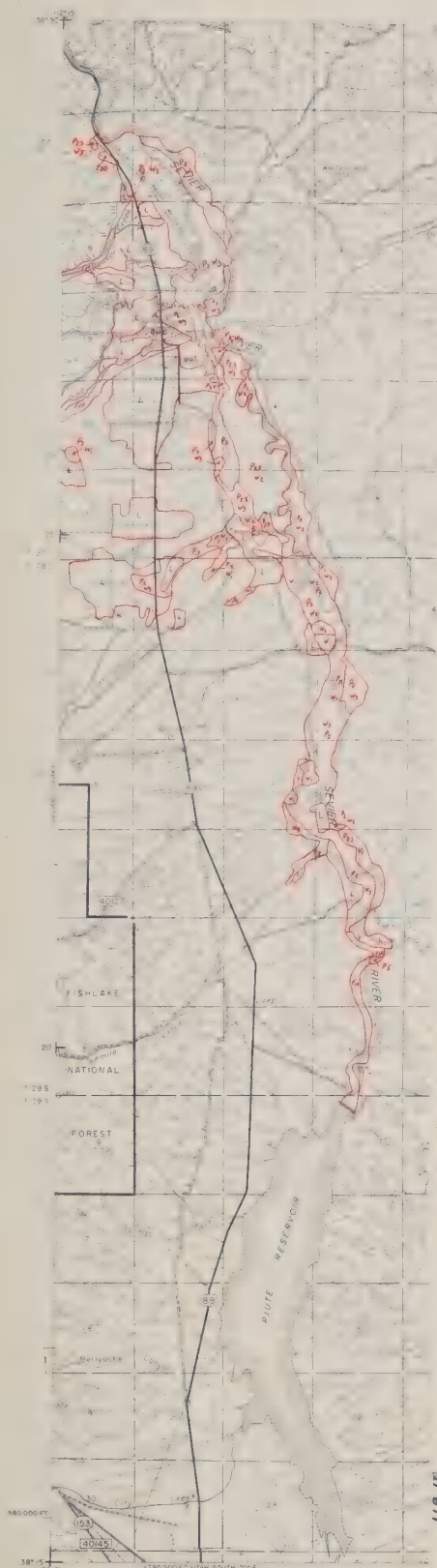


97 U

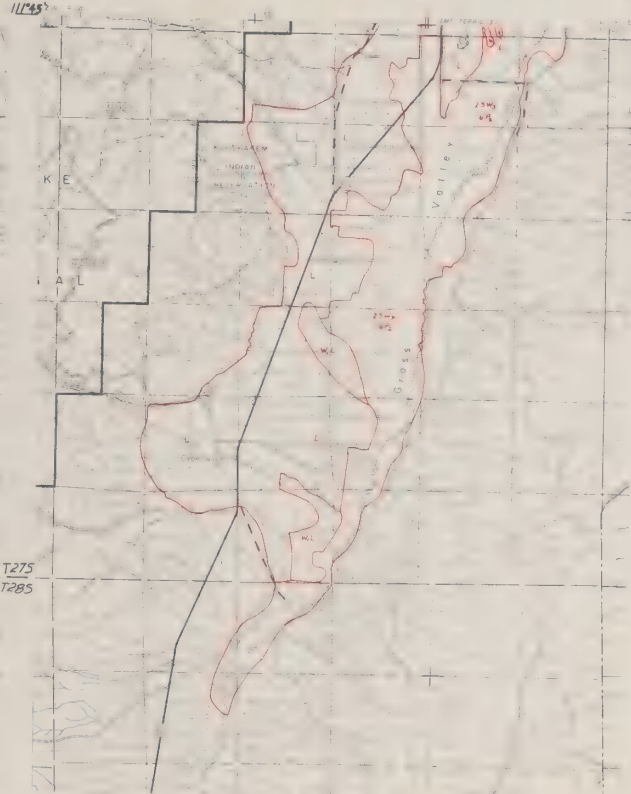


98 U

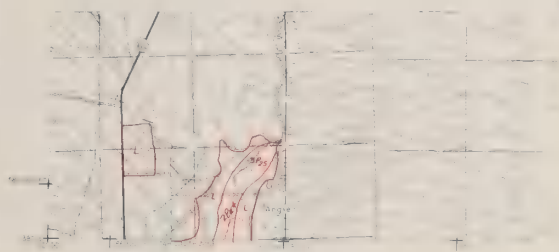
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 State of N.H. Survey and Report 1961
 Fishlake, H.F. Survey and Report 1962



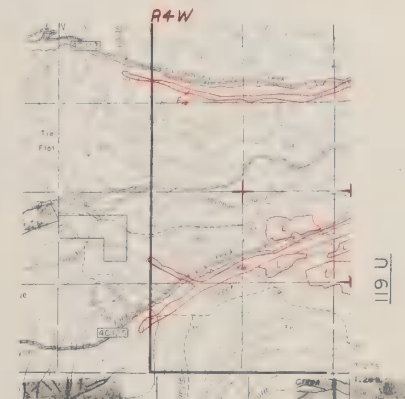
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 from 1950-55 Photoregistry Data 1953-54
 Project: Progress 1973-1975
 15,000 ft. Grid Based on UTM Coordinate System
 South Zone
 Edited and Revised 1982



T275
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18

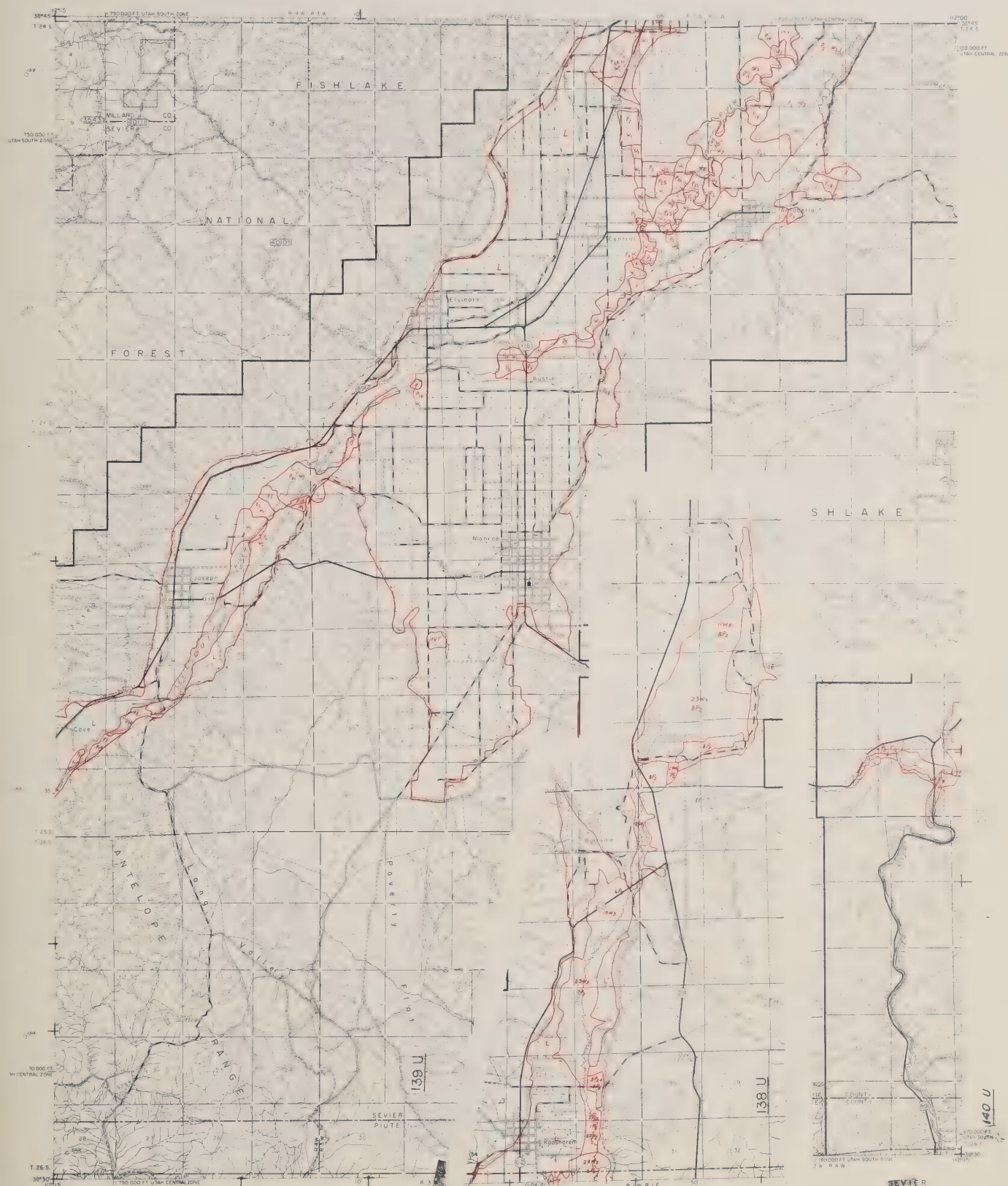
18

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MARYSVALE
 FISHLAKE NATIONAL FOREST
 185-1120/15

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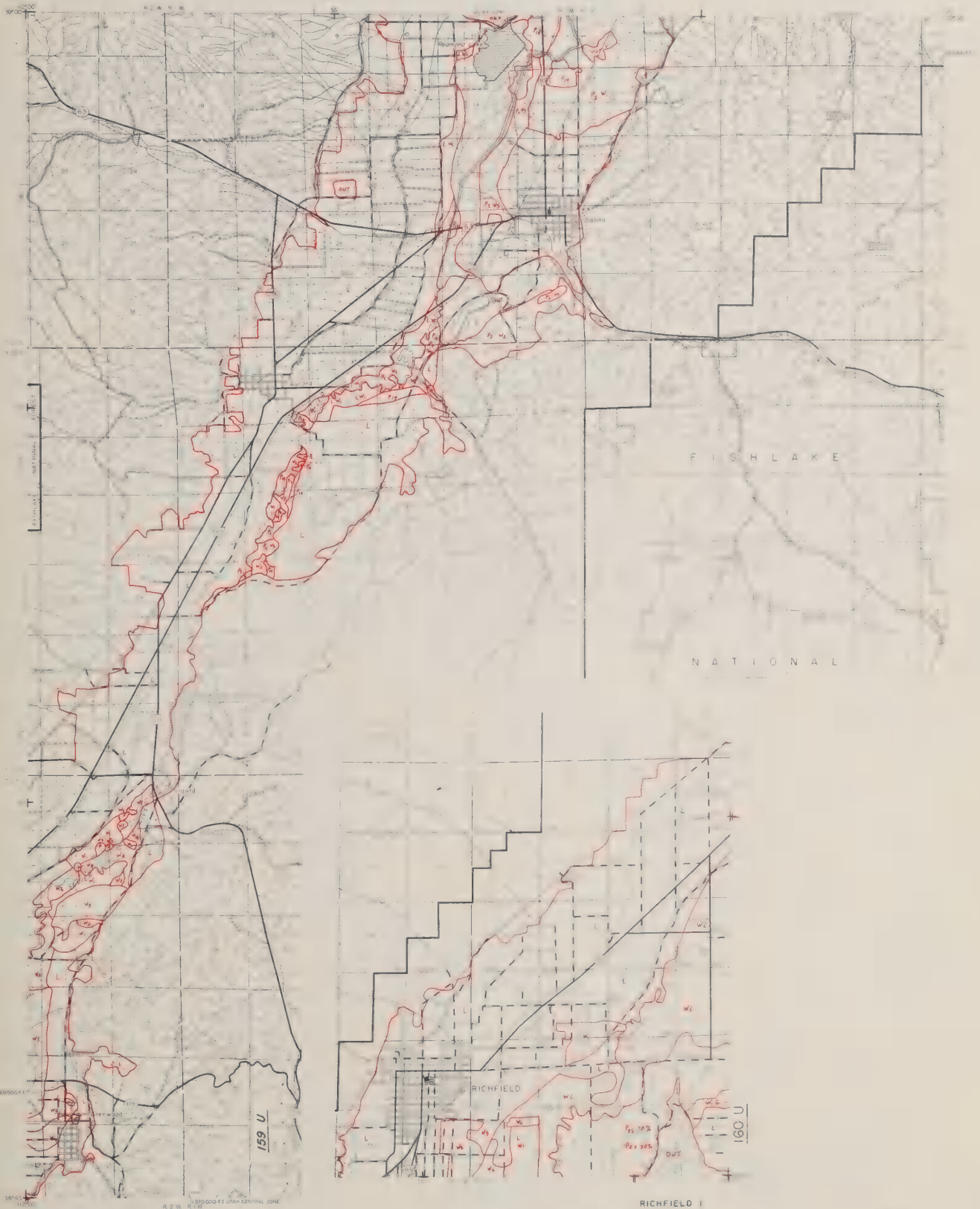
USFS Photographic Series Map
 Contour Interval: 100 Feet
 Scale: 1:50,000
 Projection: UTM
 Datum: NAD 83
 Contour Interval: 100 Feet
 Contour and Spot Elevation
 Contour and Spot Elevation
 Contour and Spot Elevation

SEVIER
 MONROE
 FISHLAKE NATIONAL FOREST

3935-1-20-15

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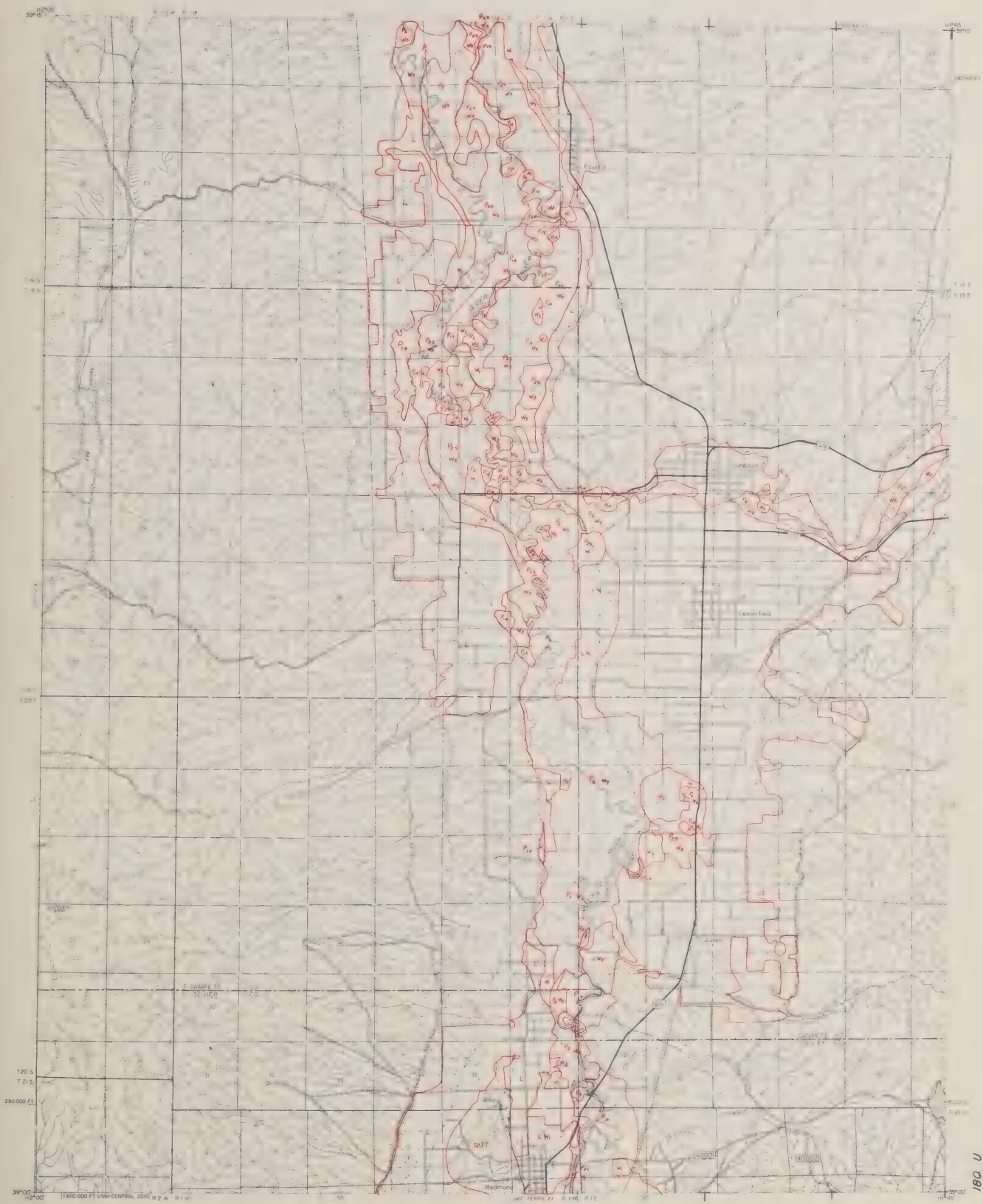
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MT. TERRIL 2
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Revised Edition 1957
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System, Contour Lines
1954 and Revised 1962

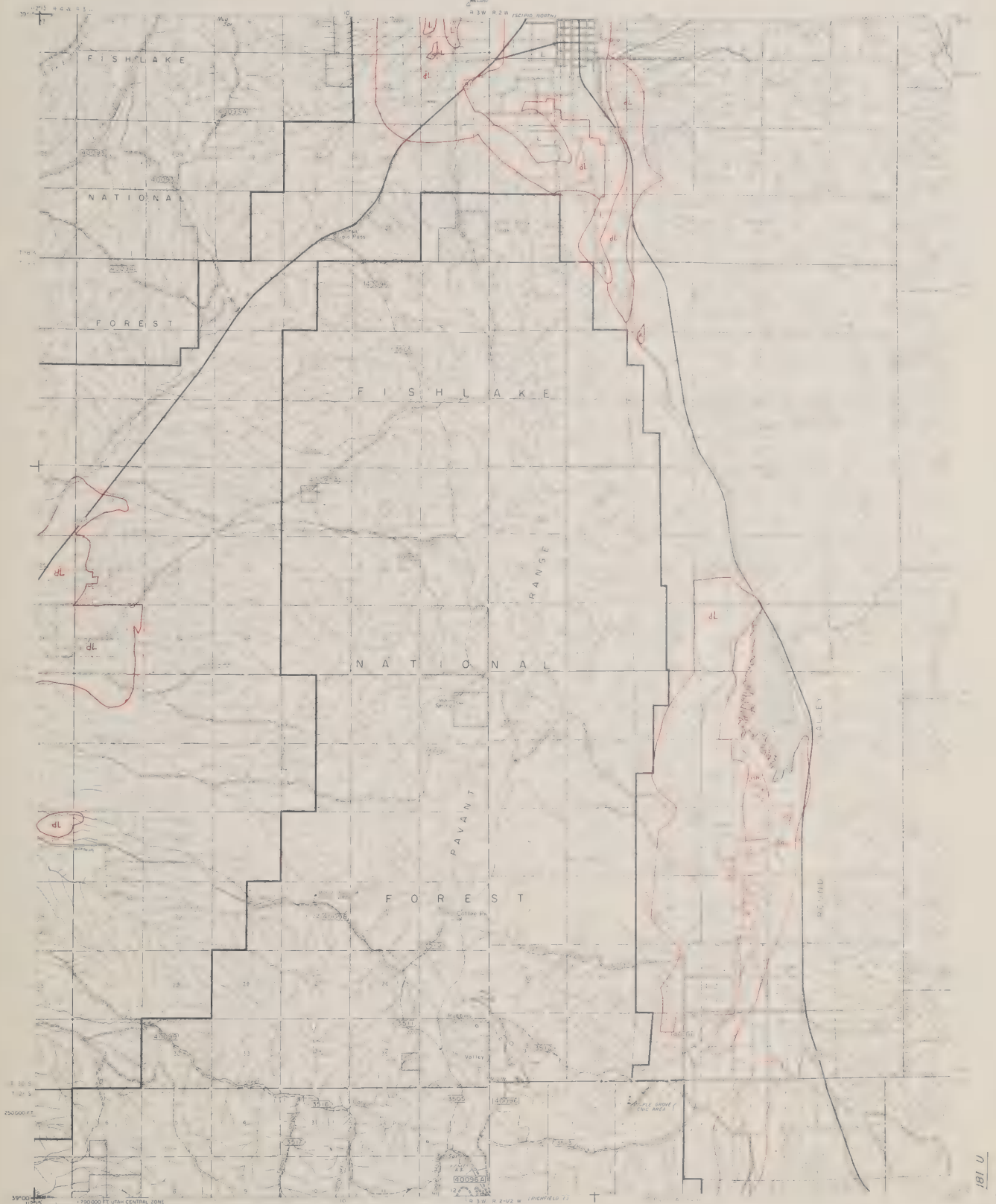
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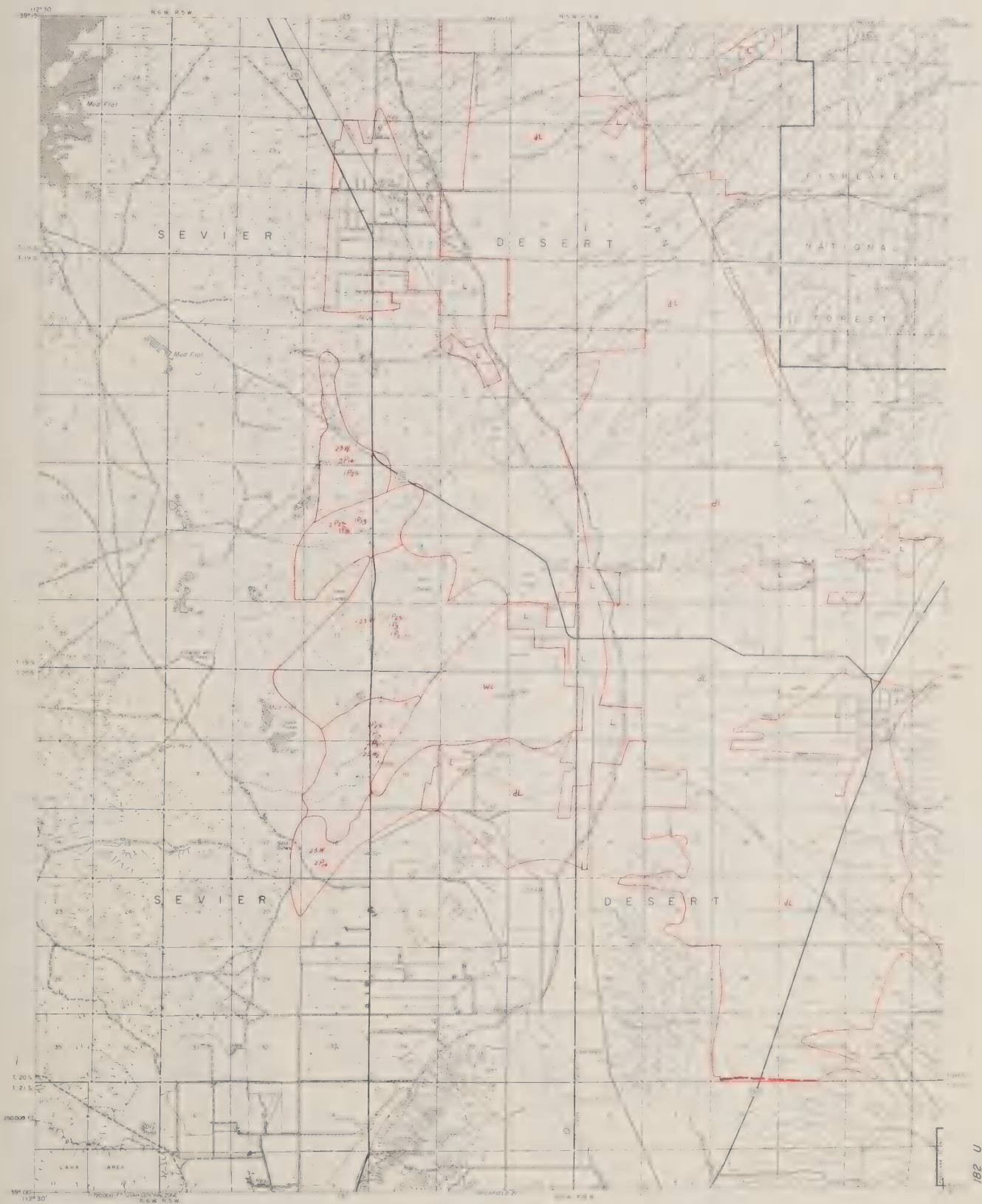
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UTAH
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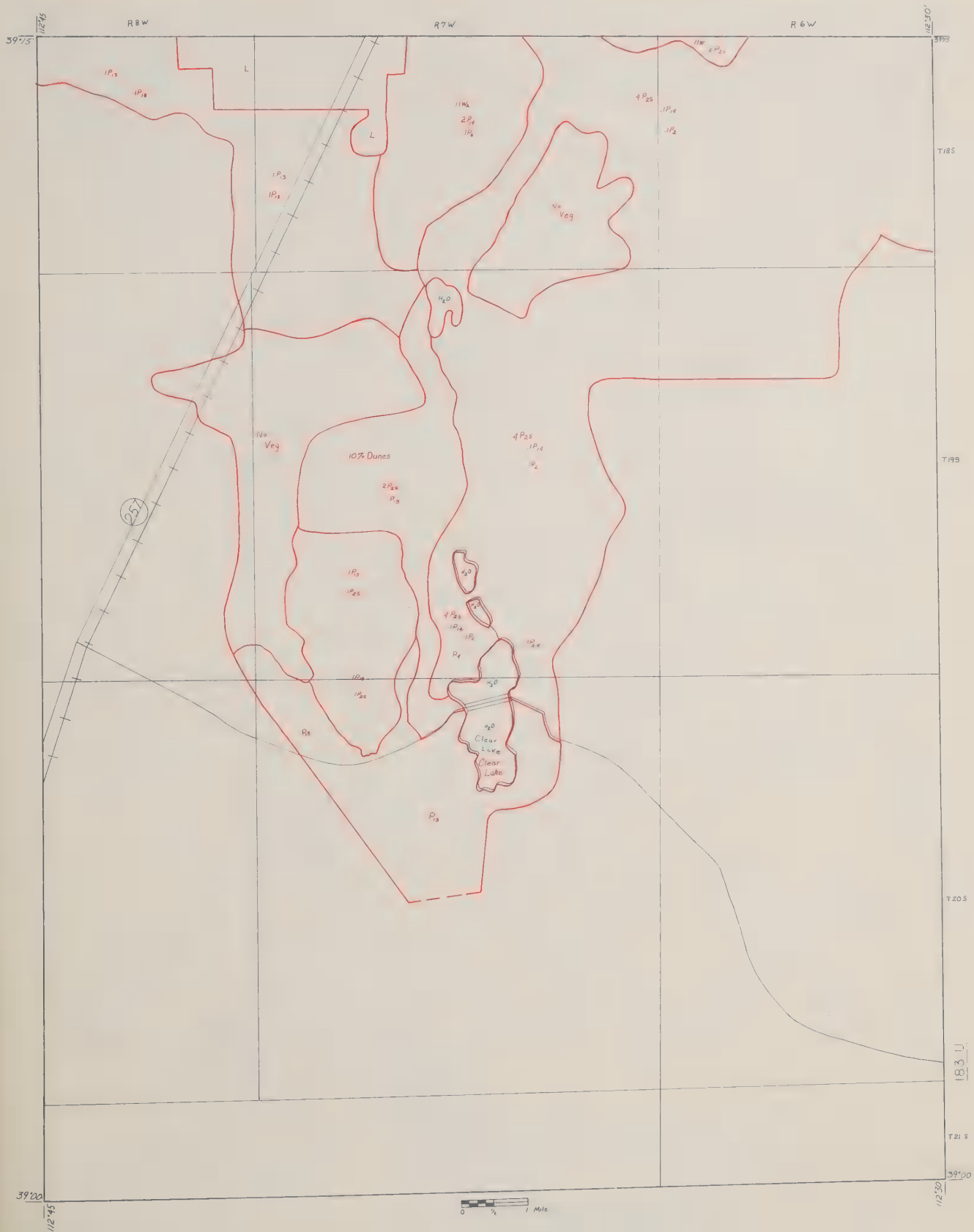




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 Polyconic Projection (27 NAD)
 QDSG: Not Georeferenced to UTM Coordinate System
 Center: Zone
 Contour Interval: 100'

SCIPIO 3
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 3900-112-5/15

182 U





17-A

18-A

19. A

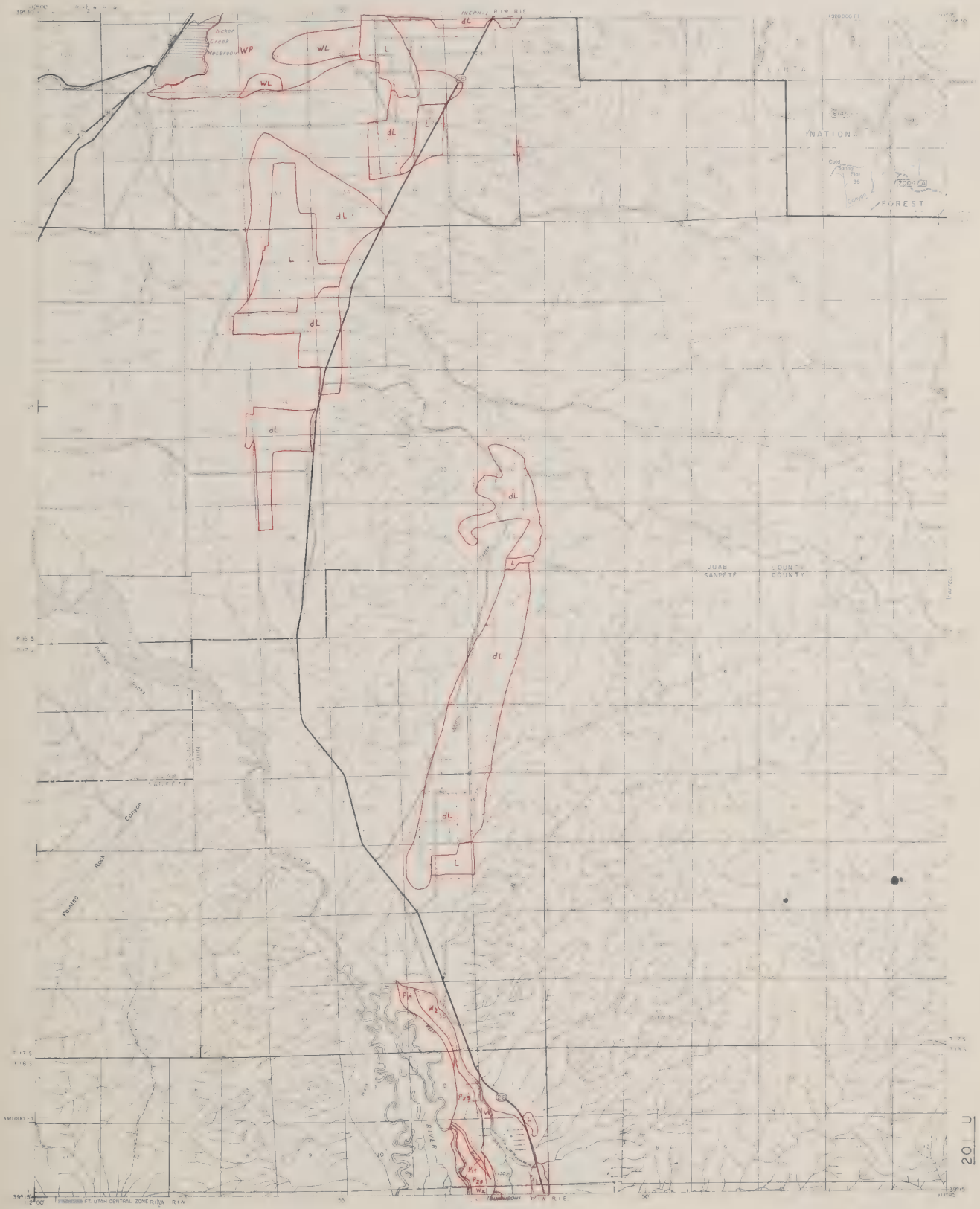
3915-113078



(5-A)

(6-A)

K 46-III-B



USFS Planning Series Map
Constructed By Photogrammetric Methods
Scale 1:50,000 Photography - Jan 1955
Photographic Station 1927 M.S.
10,000 Ft. Grid Based On Utah Coordinate System
Control Zone
Edited and Revised 1962

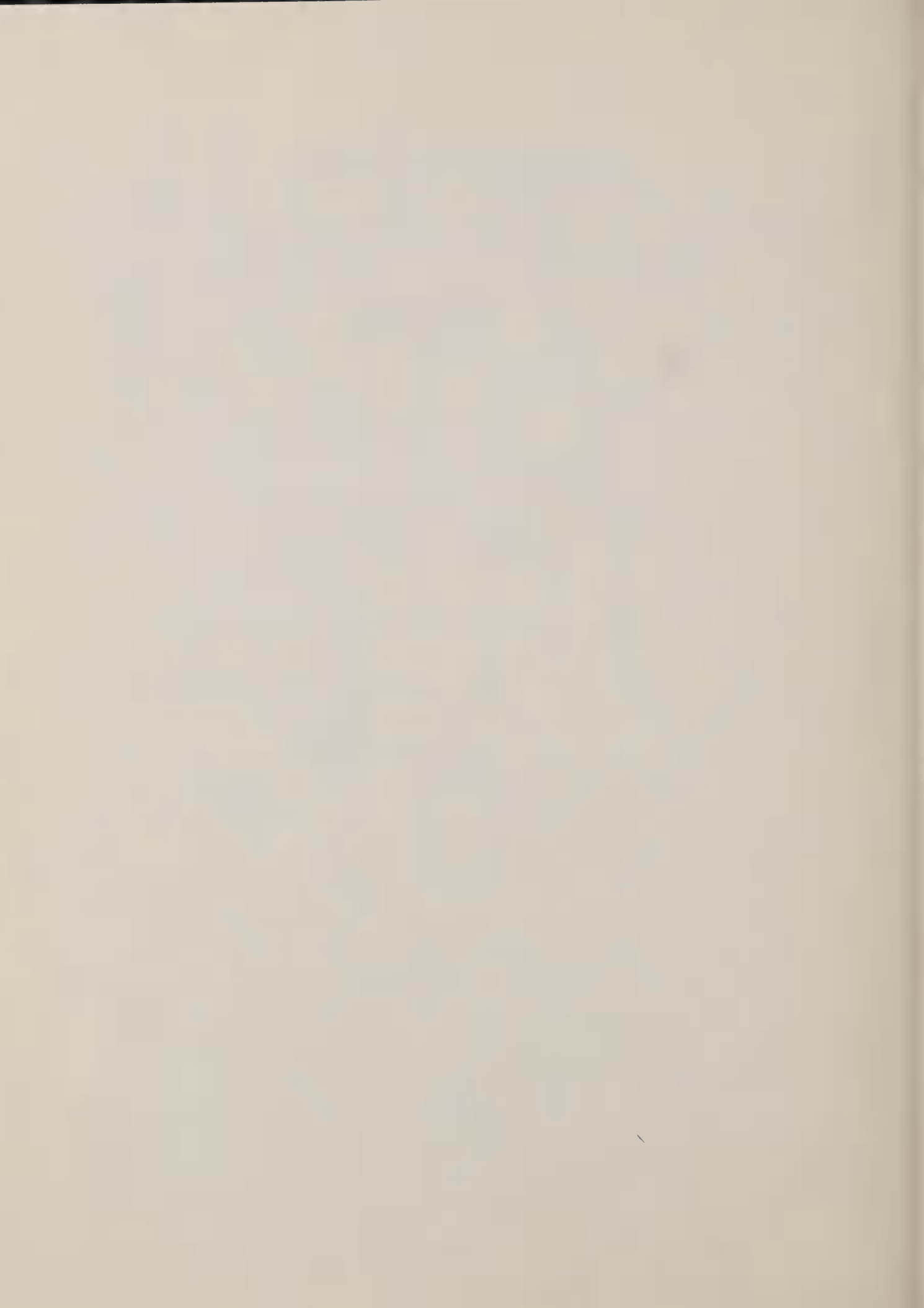
1:31860
MILE

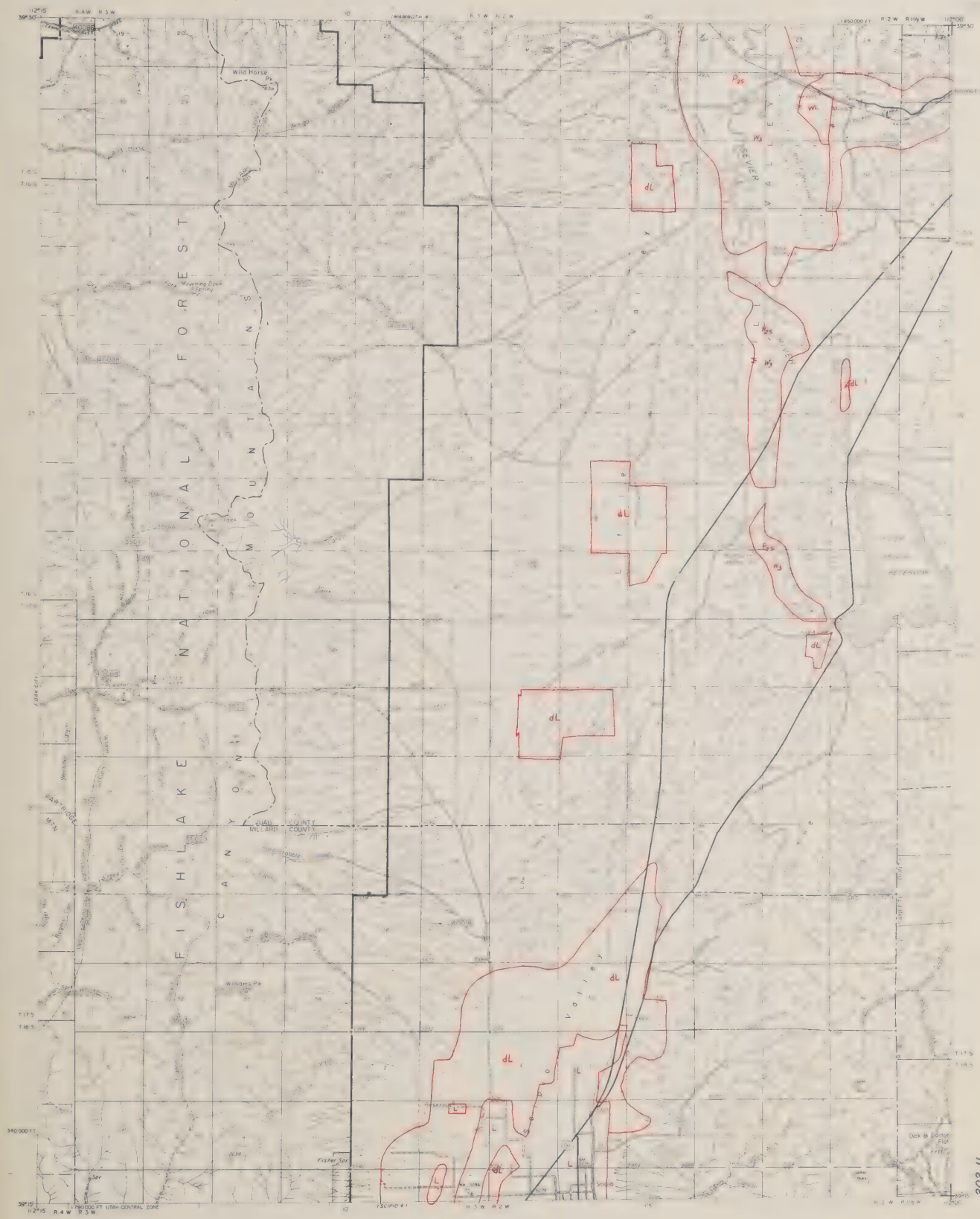
AXTELL 2
UINTA NATIONAL FOREST
3915-11145/15

201 U

(5-A)

(6-A)

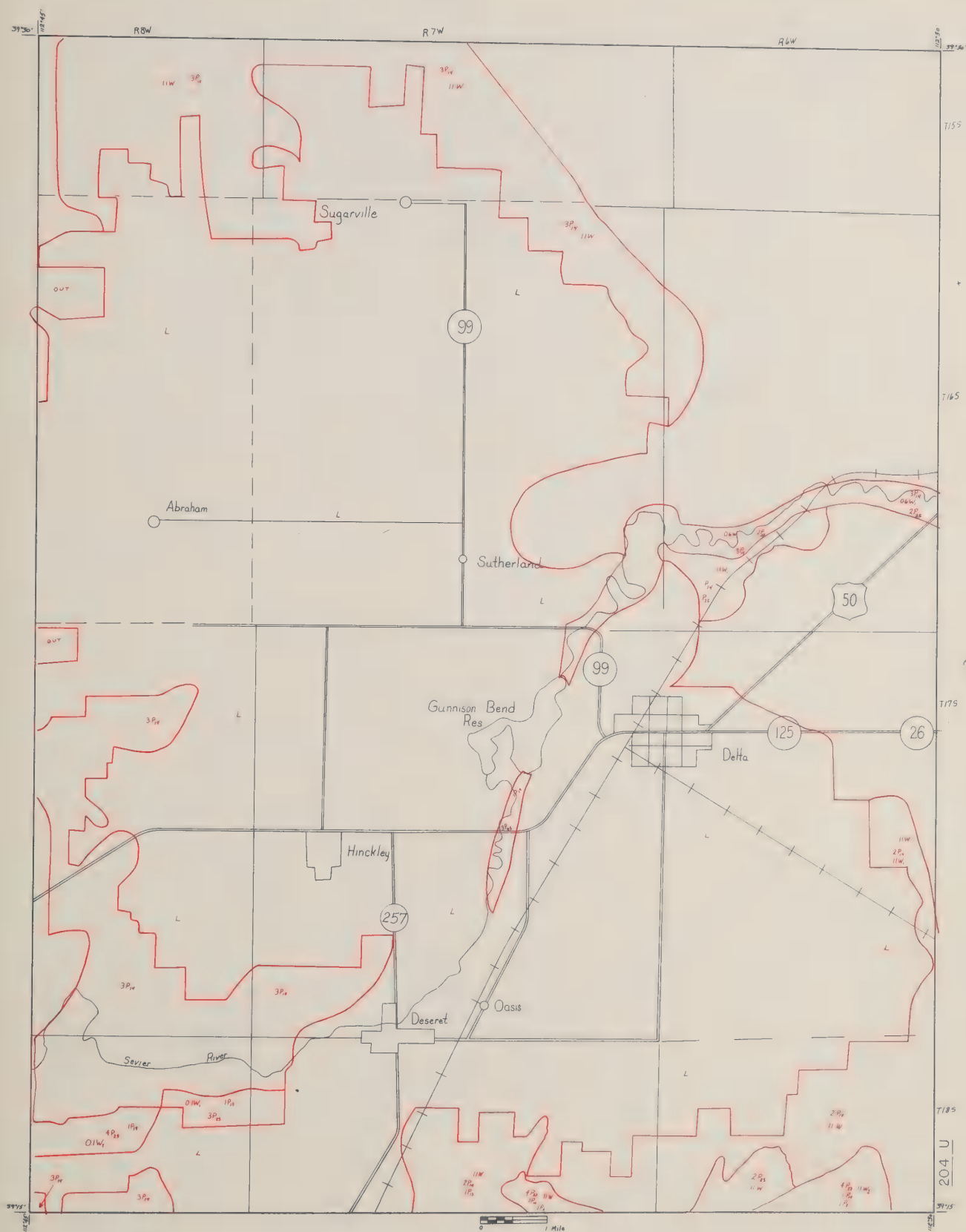


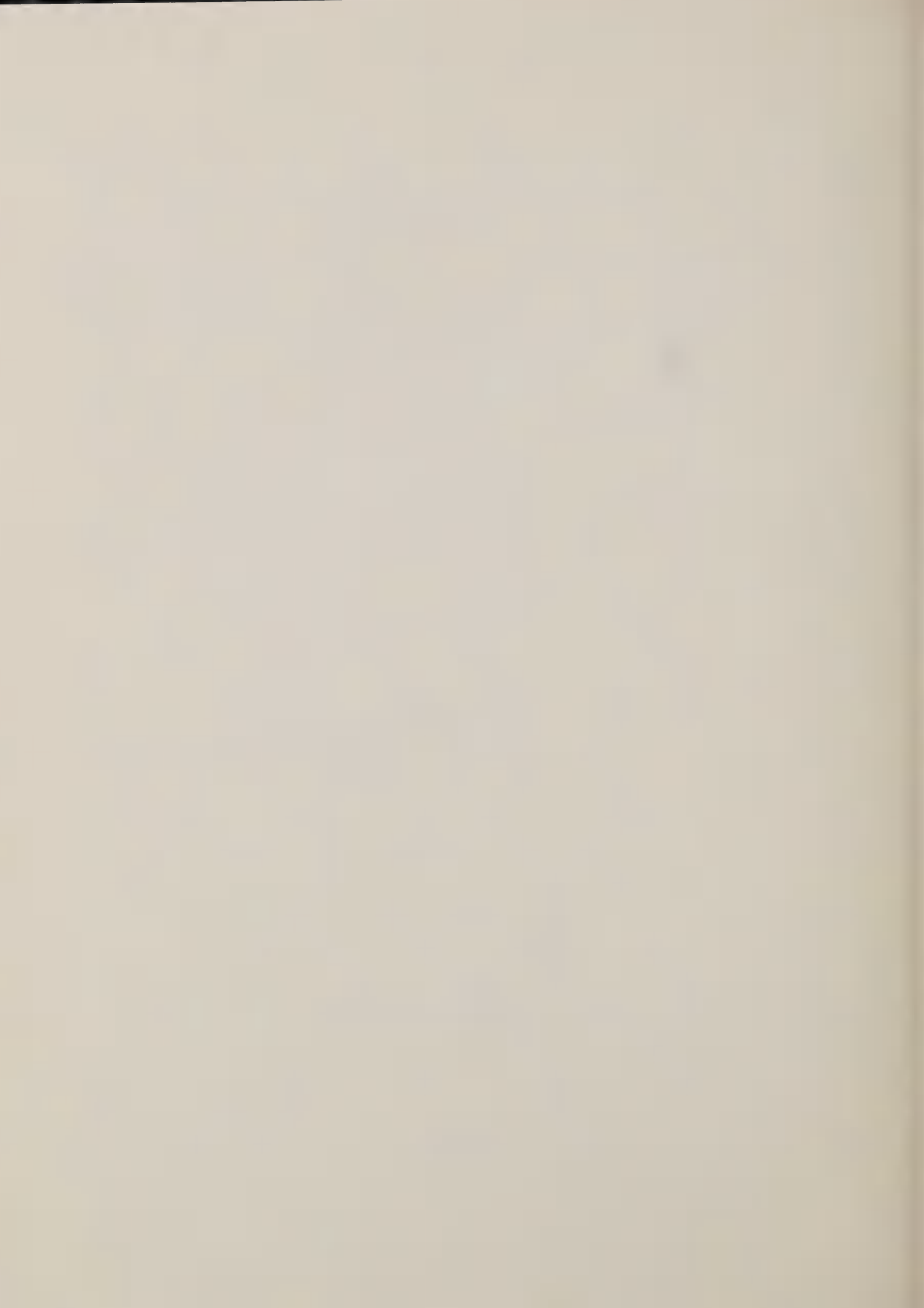


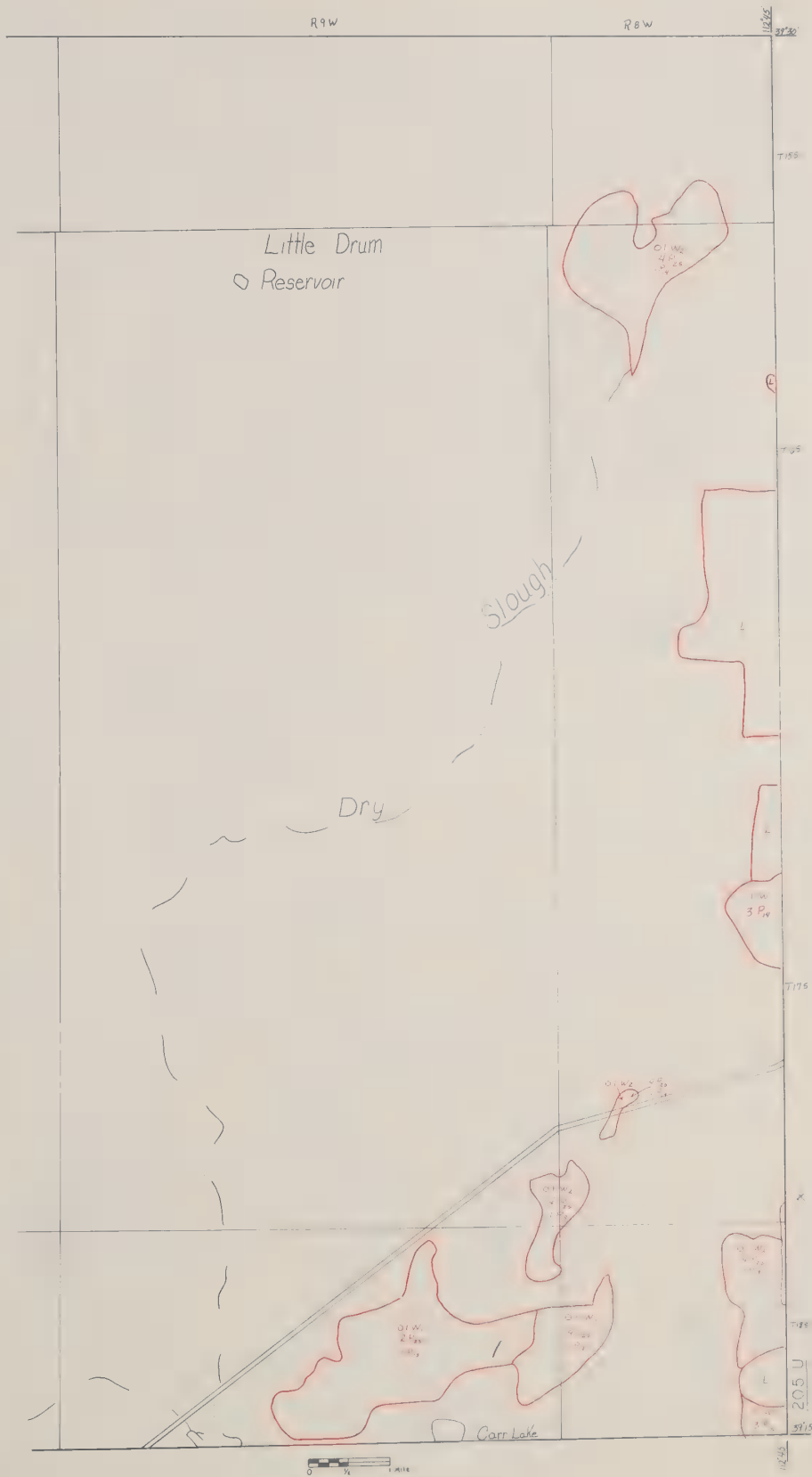
Compiled by USFS, Bureau of Land Management, 1960
 from USGS Topographic Maps, Series 100
 (containing 1:50,000 Scale 100
 hydrographic information 1927-1940)
 (1:50,000 Scale) and based on Utah Coordinate System
 Contour Interval 100 Feet
 Edited and Revised 1963

1:50,000
 This map complies with F.S. manual requirements for planimetric series maps

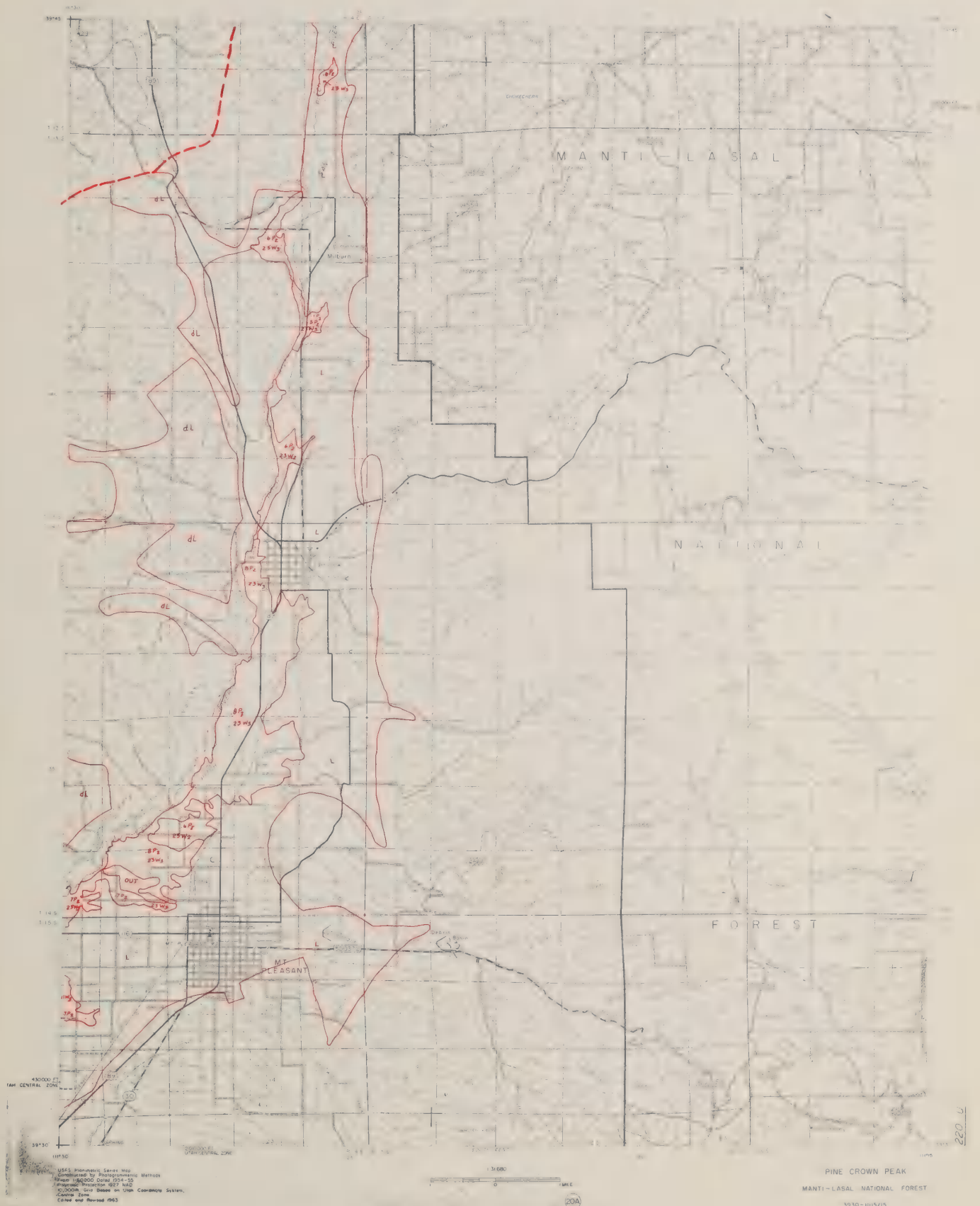
SCIO NORTH
 FISHLAKE NATIONAL FOREST
 102°00'00" W
 102°30'00" W

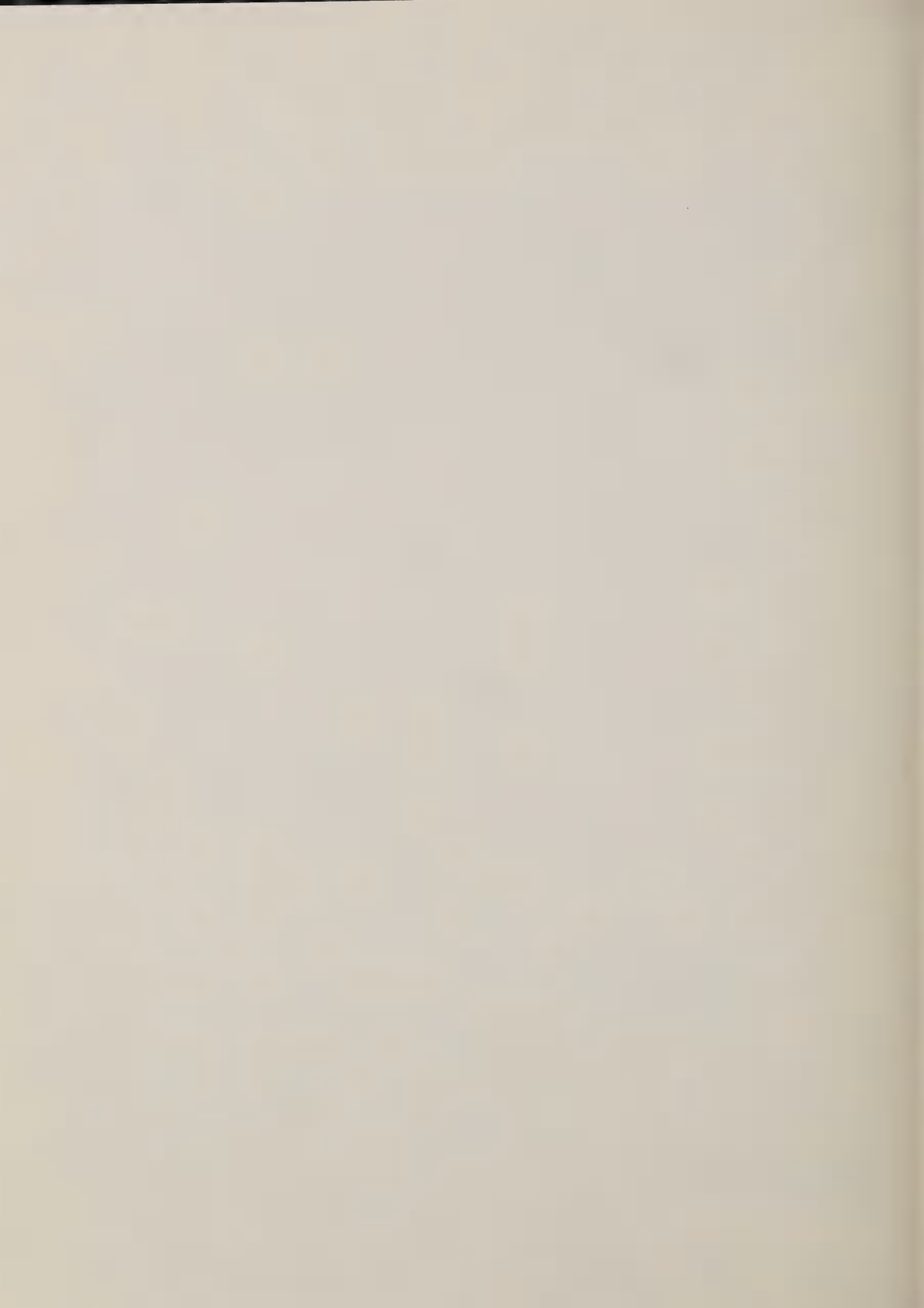


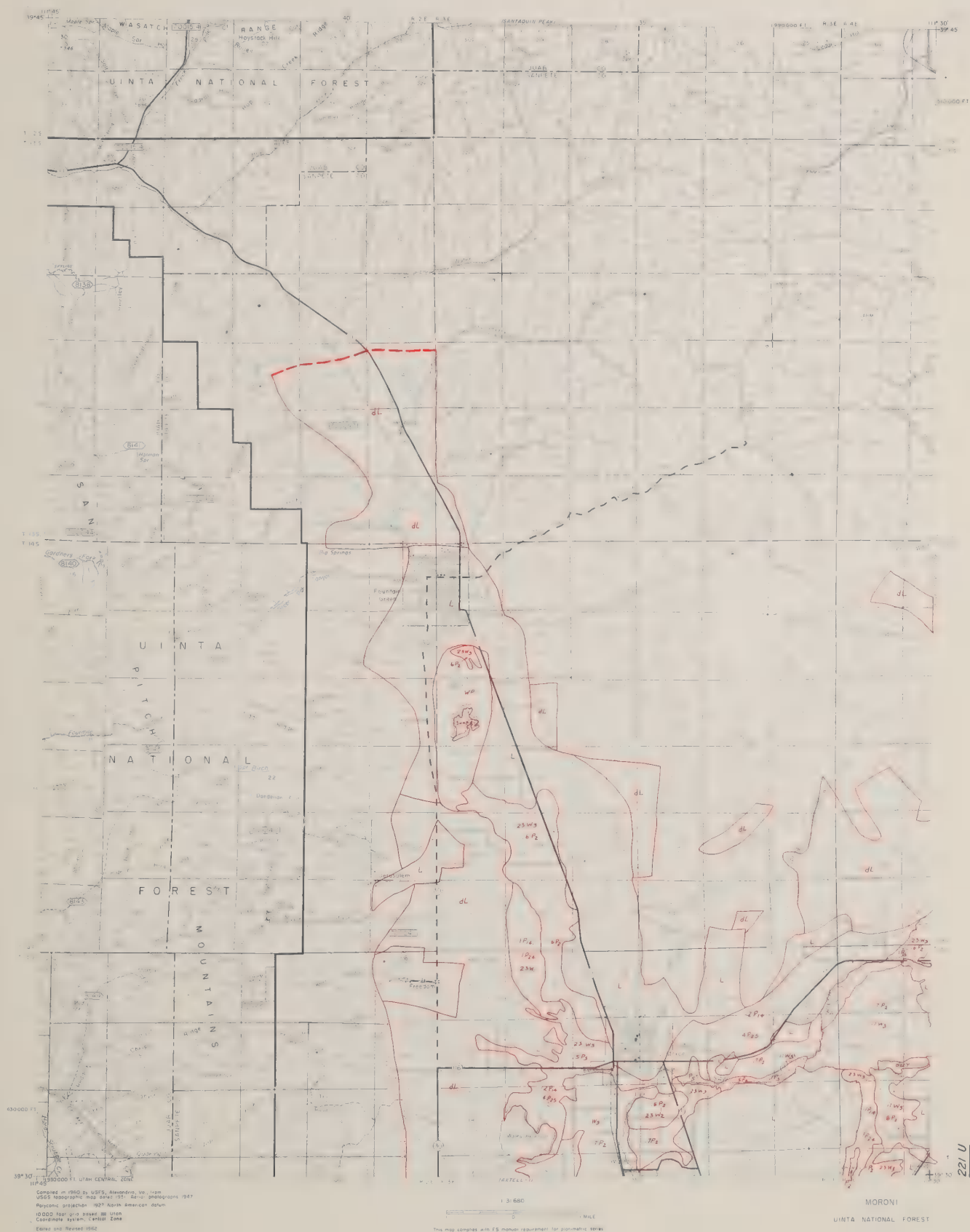




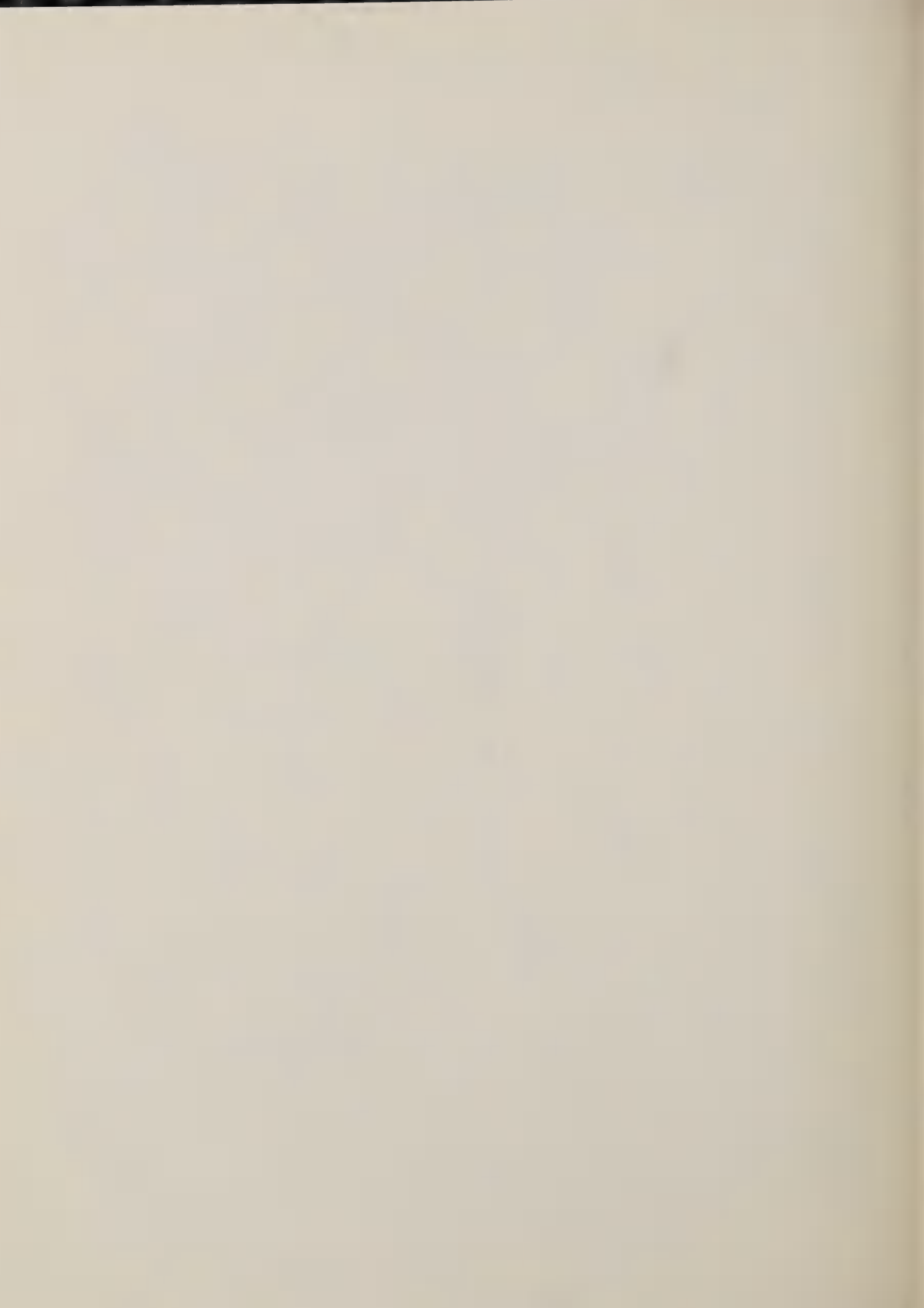


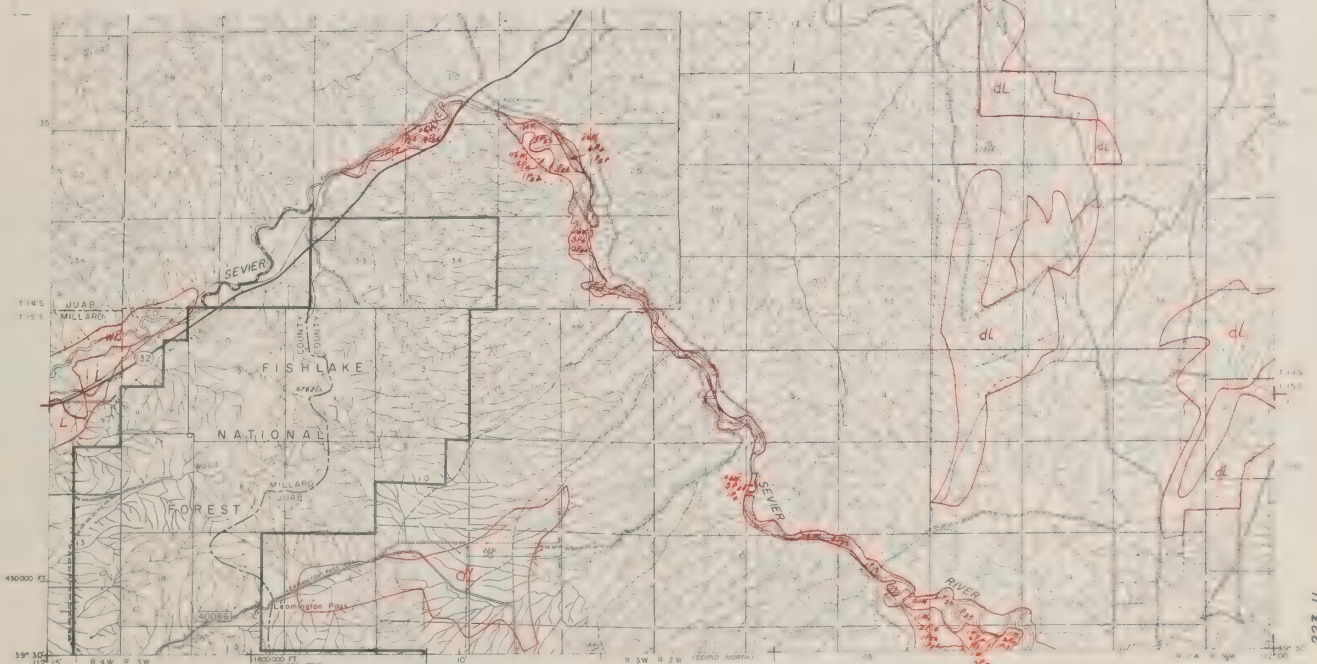
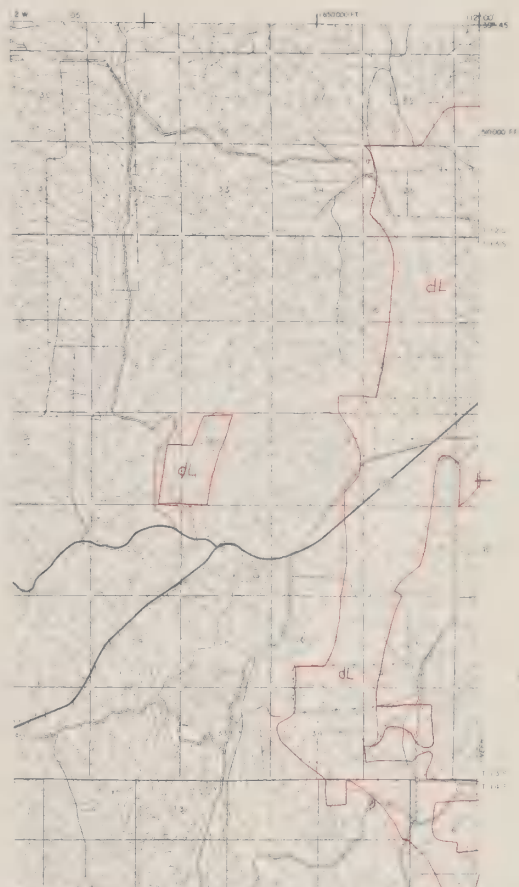
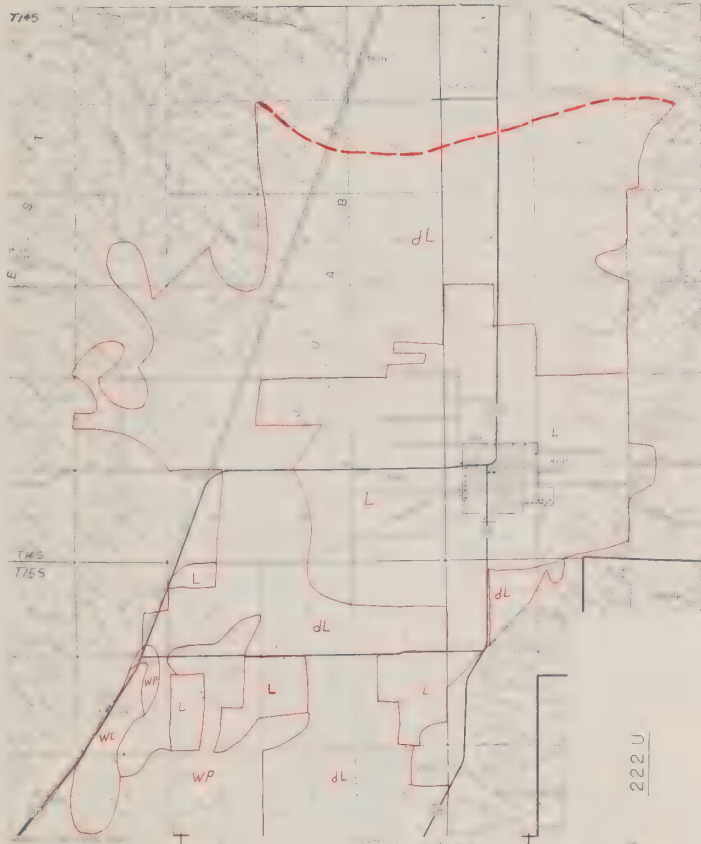






221 U





USFS Planning Series Map
 Contained by Photographic Station
 from 180,000 Photographic Station 933
 Photographic Station 933 840
 0.000 11 East River on Line Coordinate System
 Central Zone
 Edited and Revised 1992

MAMMOTH 4

FISHLAKE NATIONAL FOREST

3930-11200/10 (15A)

WLF #10

